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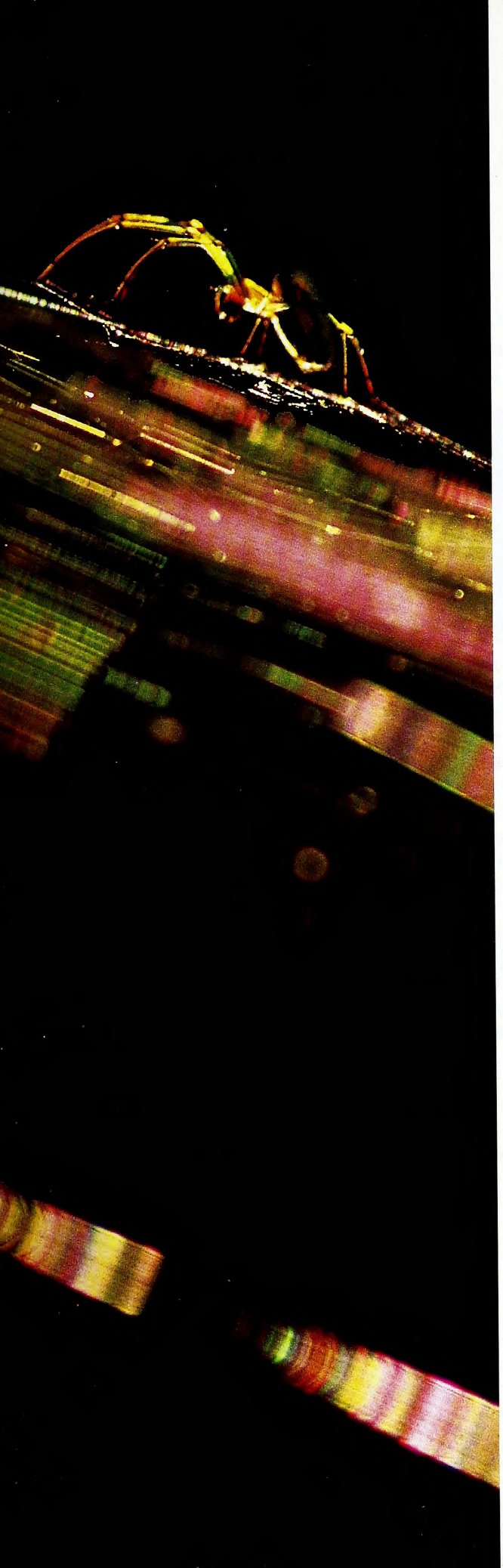
WILDLIFE IN NORTH CAROLINA

WILDLIFE IN NORTH CAROLINA
2005 PHOTO COMPETITION

Persistence pays for the orchard spider that trapped its dinner and for the photographer who returned the next day to capture the perfectly illuminated web on film. **PHOTOGRAPH BY ED ERKES.**



Volume 70 | Number 1

WILDLIFE IN NORTH CAROLINA

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Cover: A juvenile ruby-throated hummingbird asserts his claim to a petunia flower when a honeybee ventures too close. PHOTOGRAPH BY JOHN STROUD.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

This special wildlife photography issue marks the beginning of Volume 70 of *Wildlife in North Carolina*. The very first issue sported the banner *Wildlife Management in North Carolina* on the cover, along with a line art cameo of a quail. No other illustration or photography was included in the eight-page pamphlet. But by the time the second volume rolled out in 1938, wildlife photographs appeared on the cover, and shots of robin roosts, muskrat lodges and forage crops enhanced the feature articles. Our 1938 covers portrayed a swimming tundra swan, a lone quail, a close-up of blackberry blossoms, a Piedmont landscape and twin beagle pups. Those first camera subjects hint at the range of photographs published by the magazine over the years.

JILL VITAS

Great wildlife photography has become a trademark of *Wildlife in North Carolina*. The magazine has run photo competitions at least since the 1960s, so we thought it fitting to acknowledge the magazine's longevity by reviving the tradition. In this issue we offer just a few of the fine images entered in the 2005 Wildlife in North Carolina Photo Competition.

Photographers from across North Carolina submitted more than 3,300 entries digitally to the Wildlife Commission Web site. The entries were scrutinized by a panel of four judges, each of whom brought a different perspective to the very subjective task of selecting a good image. Mike Dunn, whose wildlife photographs have been published often, looked for dramatic subjects in appealing light, along with sharp focus, particularly at an animal's eyes. But for an action shot such as the well-composed wolf image above taken at the N.C. Zoo, he favored the blur that indicates an animal on the move.

Each of the entries, award-winner or not, was created by someone whose bond with nature inspired him or her to capture a particular moment. Our congratulations to those who so ably portray the natural world through excellent wildlife photography.

Margaret Martin

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WILDLIFE IN NORTH CAROLINA

JANUARY 2006 VOLUME 70, NUMBER 1

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Spotted Birds

The article "Hummingbirds in Winter" (Nov. 2005) incorrectly stated that 12 species of hummingbirds have been reported in North Carolina. In fact, 10 species have been reported, photographed and accepted to the state's official list by the N.C. Bird Records Committee, of which I am chair. Neither of the sightings of buff-bellied hummingbird and blue-throated hummingbird has been reported for review to the committee or to the bulletin of the Carolina Bird Club, Inc. Readers can view the state's bird list at www.carolinabirdclub.org and can submit rare bird reports through that Web site. I encourage observers of these two hummingbirds to report their details.

The article states that a broad-tailed hummingbird was seen at Kill Devil Hills in July 2005; in fact, the hummingbird in question was a broad-billed hummingbird. I greatly enjoyed the article otherwise; I appreciate the valuable service that Susan Campbell provides to the study of birds in North Carolina.

Harry LeGrand
N.C. Natural Heritage Program
Raleigh

Todd Pusser and Susan Campbell: Mr. LeGrand is correct in stating that 10 species of hummingbirds have been "accepted" to the list of the N.C. Bird Records Committee. We wanted to make readers aware of all species that have been "reported" from North Carolina. We agree that the July 2005 record we listed as the broad-tailed hummingbird was indeed a broad-billed hummingbird. The report came in as the story went to publication, and Todd made a typo in adding it to the table. We apologize for any confusion this may have caused.

When the November issue of *Wildlife in North Carolina* came in the mail, I sat down outside to read about winter hummers and Susan Campbell's banding work. I finished the article and went on to another story. Then I heard the flight of a hummingbird behind me. "No," I thought, "it can't be." It was.

The first hummer in my yard since Oct. 2 had a stippled throat, so I think it was a young male ruby-throated — very fat-looking. Has this bird got perfect timing, or what?

Ginger Travis
Orange County

Ramp Questions

Your November 2005 feature "More Than Just a Boat Ramp" was informative and the pictures were excellent. But you failed to mention when the ramp would be usable or how much it cost. If the project had been put out for bid and contracted, the completion would have been less than 60 days and at a fair price. Construction was ongoing for at least six months and the facility was not usable until late November. Cost is difficult to determine because the state has the labor on payroll and the equipment is owned by the state and therefore is free.

Jack P. Huddle
New Bern

Gordon Myers, chief of Engineering Services, N.C. Wildlife Resources Commission: The approximate cost for construction is a little more than $300,000. This figure includes design, permitting, materials, equipment rental, salaries, per diem, etc. Interestingly, many of the project delays were attributed to contractor schedules rather than Wildlife Commission staff schedules. We contracted pervious pavement and asphalt installation, and their schedules were significantly impacted by Hurricane Ophelia. We did pull our staff away from the site temporarily to try to mitigate problems with the gravel parking surface at Straits Landing in nearby Harkers Island.

Grandma Says

This letter is in response to the Back Porch article "Symposium to Address Hunter Recruitment" in the October issue. While I didn't grow up in a family that hunted, I had no objection to it. We fished a lot. I met my husband-to-be and introduced him to jig fishing. My husband and I began hunting when we moved to Lexington, Tenn.

My son never hunted much in Tennessee with his dad. He enjoyed fishing. It wasn't until we moved to North Carolina 19 years ago that he became a hunter. Now he is passing down the wonderful sports of hunting and fishing to his son, Chase, who has been fishing since he first could walk.

How do you get other children and adults involved? I don't know. There is a 4-H fishing and hunting camp above Charlotte that my son Jason went to one summer. We have a hunting club here in Jackson County and I know they help with a fishing clinic for kids at Western Carolina University. Parents have to let their children do it, and volunteers have to be committed to teaching and encouraging children.

One thing concerns me: In the picture on page 38, the child is holding a gun. Most likely, the father is teaching that child everything he needs, but he is a bit young for a hunter safety course. Chase went bear hunting recently. His uncle and someone else helped him hold the gun to shoot the bear. It concerned us because he is a bit young to shoot a high-powered rifle, even under supervision. Are we wrong?

Kathy Wilson
Sylva

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters, Wildlife in North Carolina magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

WILDLIFE IN NORTH CAROLINA 2005 PHOTO COMPETITION

More than 640 photographers entered a total of 3,324 photographs in the 2005 Wildlife in North Carolina Photo Competition. Open to amateur and professional photographers alike, the competition is intended to encourage high-quality nature photography and to identify talented wildlife photographers in North Carolina. More than 60 young photographers entered in the two youth categories, a number we hope will grow in future years as more young people discover the rewards of capturing the state's natural world with a camera.

Winning photographs are printed throughout this issue. On the cover is John Stroud's photograph of a hummingbird and a honeybee, the judges' pick for the grand prize. The photographer had never seen a hummingbird with beak agape like this one, and neither had the judges. The picture was taken with a Fuji digital camera and zoom lens set at f/6.3, 1/1200 second. An exhibition of award winners in the 2005 Wildlife in North Carolina Photo Competition will be held through March at the N.C. Museum of Natural Sciences in Raleigh. For a schedule of other locations hosting the exhibition and for details on the 2006 competition, check www.ncwildlife.org.

The most popular category for entries was Invertebrates (636 entries), followed closely by Birds (548) and the landscape category, Peaks, Valleys and Plains (544). The Habitats of Concern category was designed to bring attention to natural communities that are part of the recently finalized N.C. Wildlife Action Plan for nongame conservation.

Only photographs taken in North Carolina in the last five years were eligible. Entrants have stated that no photographs were manipulated beyond conventional darkroom techniques, and captive animal subjects are labeled as such. Digital file-size limitations, not the quality of the image itself, restricted the final print size of some images in this issue.

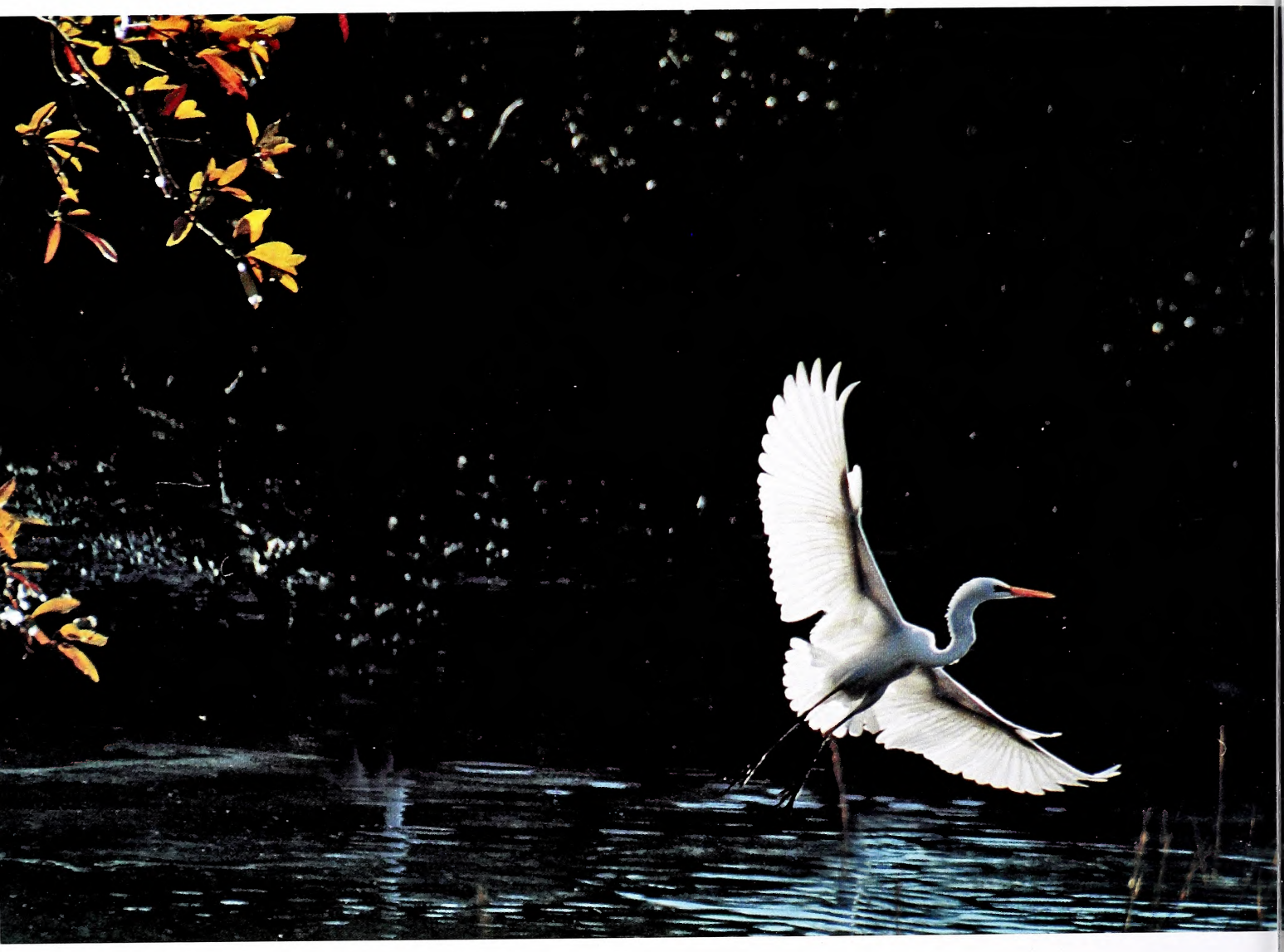
Judges for the competition were selected for their experience in producing or choosing superior photography. Vickie Cumbee is art director for *Wildlife in North Carolina* magazine. Educator Mike Dunn provides photography for the N.C. Museum of Natural Sciences, where he is coordinator of teacher education. Professional wildlife photographer Derrick Hamrick is a past winner in the prestigious BBC Wildlife Photographer of the Year competition. John Hansen is the photo editor for the features department at *The News & Observer* of Raleigh.

We wish to thank our corporate sponsors, Eastman Kodak Company and J.W. Photo Labs of Raleigh, for their generous participation in this year's competition. Valuable support was provided by *The News & Observer* features department and the UNC-Chapel Hill School of Journalism. Co-sponsors were the N.C. Wildlife Resources Commission and the N.C. Museum of Natural Sciences, whose staffs devoted much time and many talents to the competition.

GRAND PRIZE WILDLIFE IN NORTH CAROLINA PHOTO COMPETITION 2005

John Stroud, Raleigh
Hummingbird chasing away bee, Raleigh

The photographer took many pictures of hummingbirds and just as many of insects before this hummer and honeybee appeared in front of his lens at the same time. The camera was mounted on a tripod by Stroud's office window, about 5 feet from the subject.



BIRDS **FIRST PLACE**

Elton Matheson, Emerald Isle
Great egret landing, Cape Carteret

Matheson captured this egret touching down on a pond near White Oak Elementary School in the fall of 2004. Sunlight illuminates the majestic bird's wings from behind.

BIRDS **SECOND PLACE**

Ed Erkes, Goldsboro
Indigo bunting, Johnston County

Erkes spotted this brilliant bird while driving through Howell Woods Environmental Learning Center in the spring of 2005. He got the shot without leaving his car.

BIRDS **THIRD PLACE**

Paul Grecian, Quakertown, Pa.
Ibises at sunset, Pea Island

The photographer travels frequently to the Outer Banks for the opportunity to catch wildlife in dramatic lighting.

BIRDS **HONORABLE MENTION**

Doug Leister, Morehead City
Ring-billed gull, Atlantic Beach

During a sunrise visit to Sportsman's Pier in January 2005, Leister placed bread on the railing and stood close enough to spook the gulls approaching to grab the bread. He used a fill flash into the sun to capture this unique image.

BIRDS **HONORABLE MENTION**

Joe Young, Shelby
Brown pelican, Southport

Young saw this pelican in repose on a harbor-side boardwalk near sunset and zoomed in to get this portrait. His crop accentuates the bird's prominent bill.

MAMMALS **FIRST PLACE**

John Mauser, Hubert
Harbor seal heading to sea, Cape Lookout

Mauser's impeccable timing during a spring photo expedition to Cape Lookout allowed him to catch this harbor seal just before it returned to the ocean. Harbor seals are occasional visitors to our state

MAMMALS **SECOND PLACE**

Nathan Bacheler, Morehead City
Wild horse, Beaufort

Bacheler resorted to subterfuge to capture this shot of a wild horse on Carrot Island. The photographer hid in a marshy area and waited for the horse to approach within 10 feet before snapping his shot.

MAMMALS **HONORABLE MENTION**

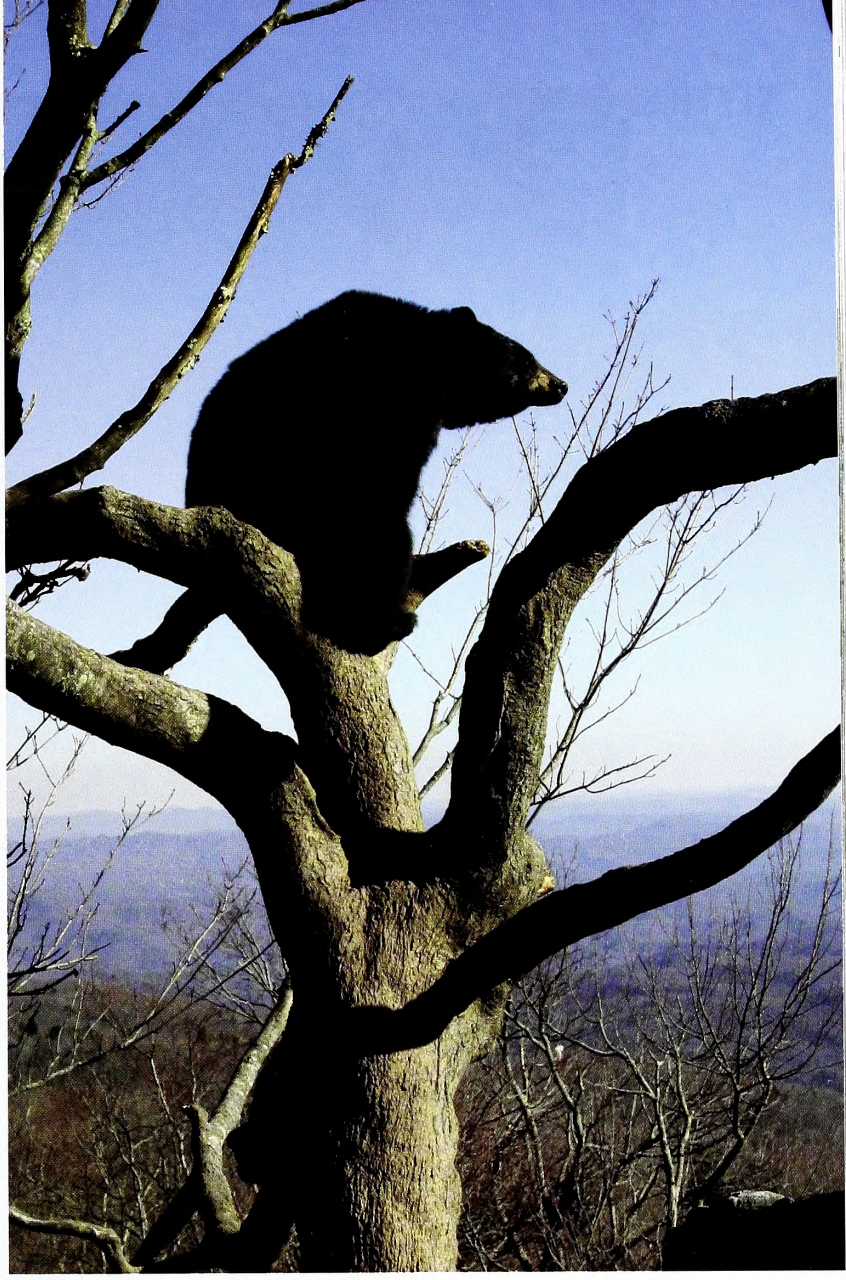
David Hattori, Apex
Baby rabbit, Apex

Sometimes a great photo is just out your front door, as Hattori discovered when he shot this image of an immature rabbit hidden among plants in his yard.

MAMMALS **THIRD PLACE**

Monty Combs, Wilkesboro
Bear in tree, Grandfather Mountain

Veteran photographer and hiker Monty Combs found this sow black bear taking a break in a tree on Grandfather Mountain.



MAMMALS **HONORABLE MENTION**

Jill Vitas, Durham
Red wolf, N.C. Zoo, Asheboro

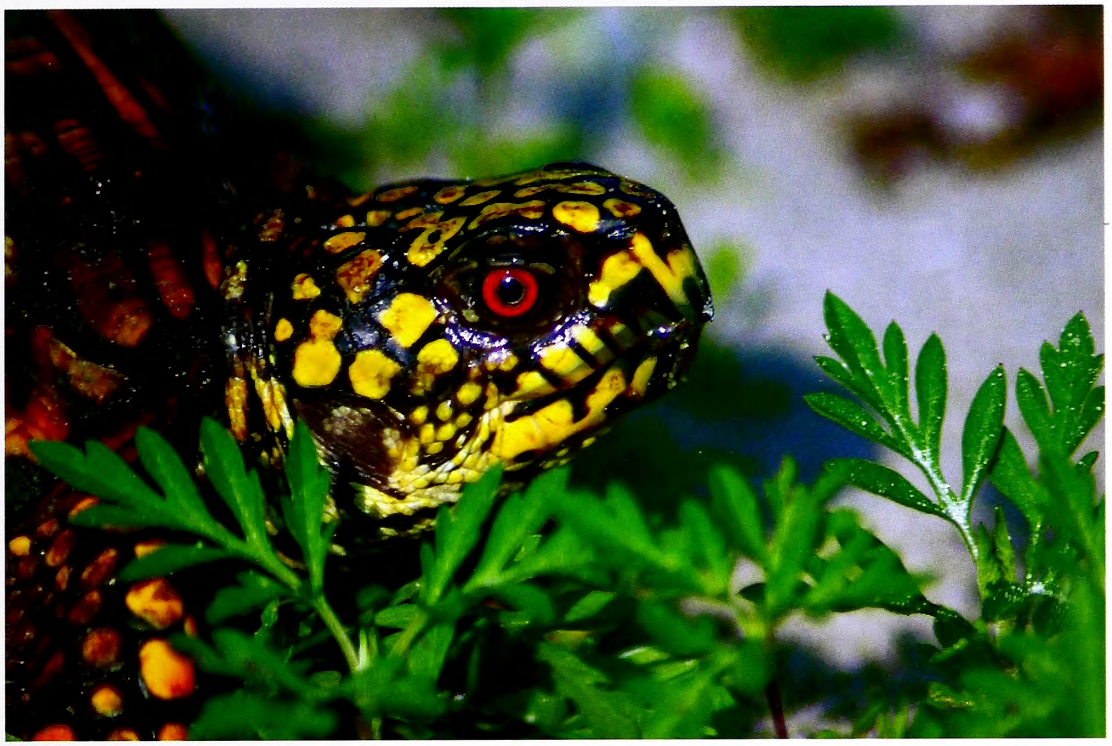
While practicing her photographic skills, Jill Vitas caught the vitality of this red wolf as it paced at the N.C. Zoo.

REPTILES & AMPHIBIANS WILDLIFE IN NORTH CAROLINA PHOTO COMPETITION 2005

REPTILES & AMPHIBIANS **FIRST PLACE**

Nick Carter, Robbinsville
Water snake, Franklin

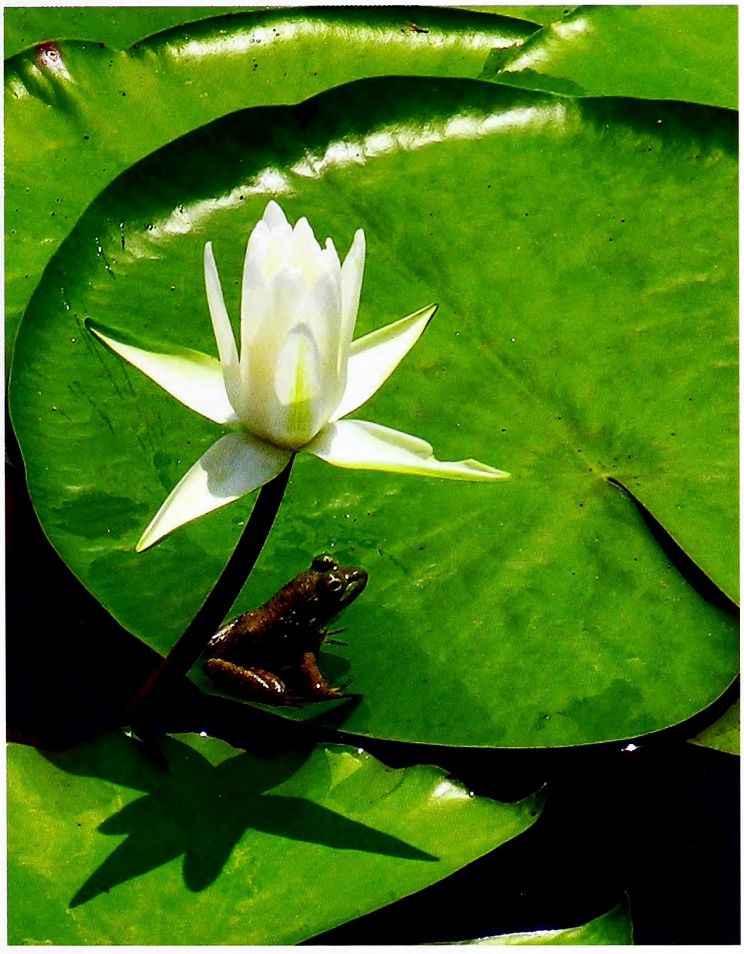
The photographer chanced to see the form of a snake emerge from the gravel bottom as he walked beside a shallow mountain creek. "For good reason, this snake thought it was invisible," Carter said.



REPTILES & AMPHIBIANS
SECOND PLACE

Nathan Bacheler, Morehead City
Box turtle, Croatan National Forest

The brilliant red of the box turtle's eye stands out like a stop sign against a field of yellow in this winning close-up image.



REPTILES & AMPHIBIANS
THIRD PLACE

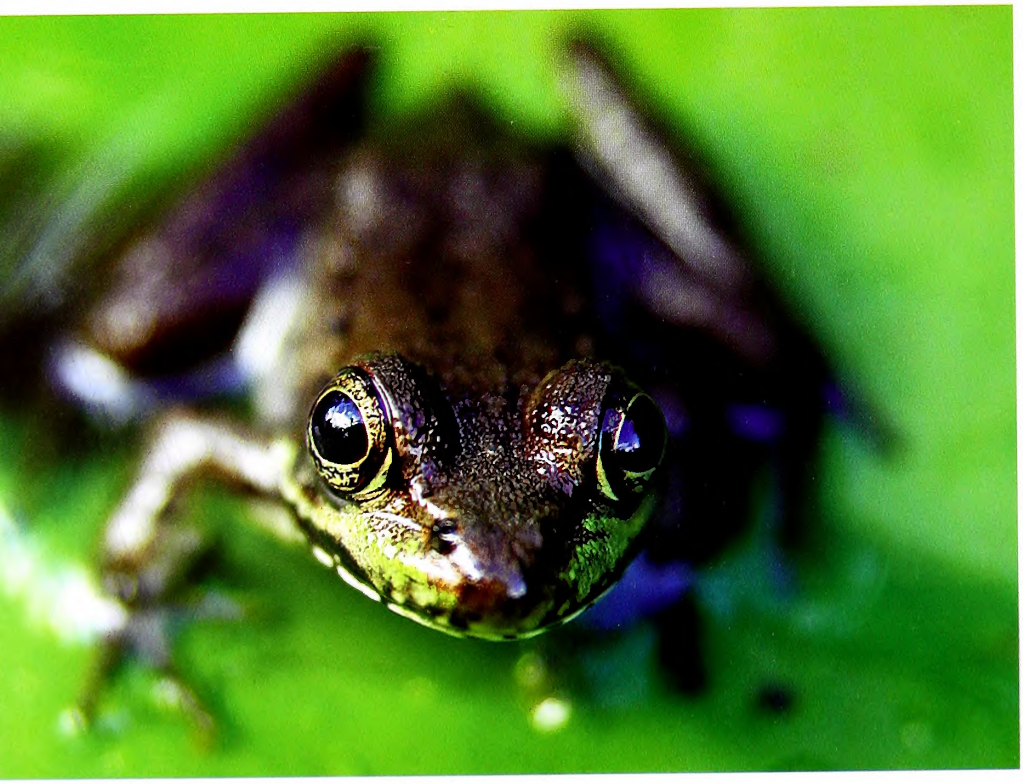
Alex McIver, Wilmington
Frog on lily pad, Wilmington

In a classic composition, frog and flower create an off-center focus for this image of calm on a day in April. McIver often scouts the lily pad pond near his home for wildlife images.

REPTILES & AMPHIBIANS
HONORABLE MENTION

Mona Sadler, Alliance
Red-bellied water snake, Goose Creek State Park

Framed by a gnarled, rough log, the smooth-skinned body of a water snake stands out in relief. Sadler saw approximately 30 snakes in this area of the park, which had been cleared by Hurricane Isabel.



REPTILES & AMPHIBIANS
HONORABLE MENTION

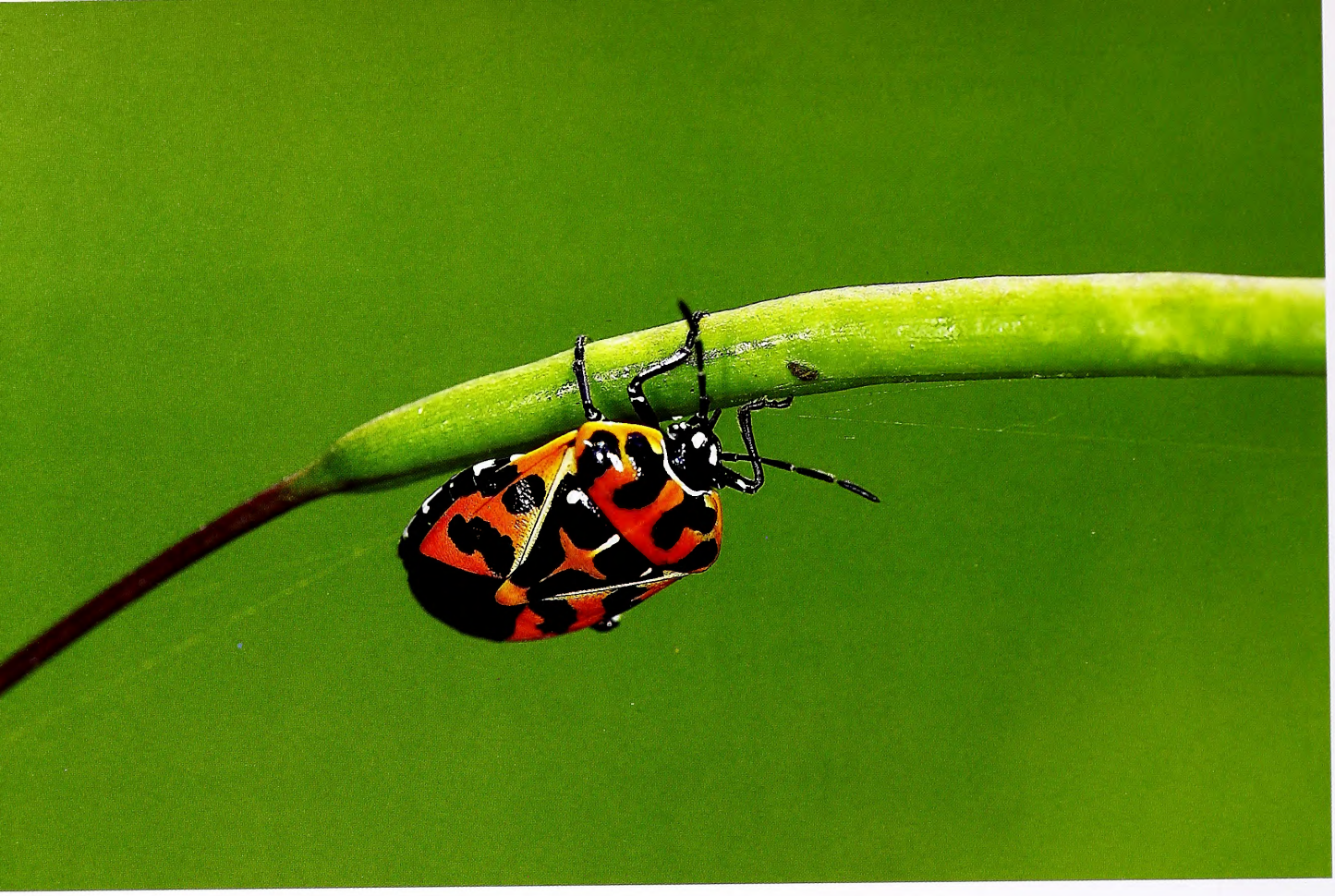
John Huneycutt, Stanfield
Frog gaze, Pea Island

Judges liked the focal emphasis on the frog's straight-on stare. The frog image was shot on a photography expedition to the Outer Banks.

INVERTEBRATES **FIRST PLACE**

John Stroud, Raleigh
Wasp in flight, Raleigh

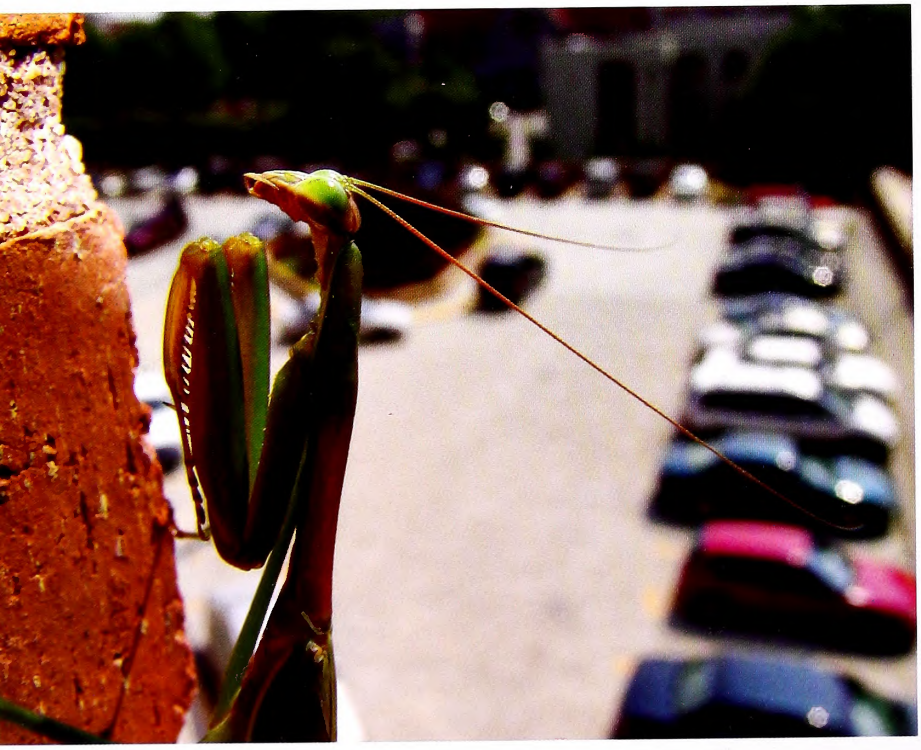
The apparent suspended animation of a wasp plays with the way we usually perceive this darting flier. The photographer used the same setup to win the grand prize (page 5).



INVERTEBRATES **SECOND PLACE**

Gary Carter, McLeansville
Harlequin bug, McLeansville

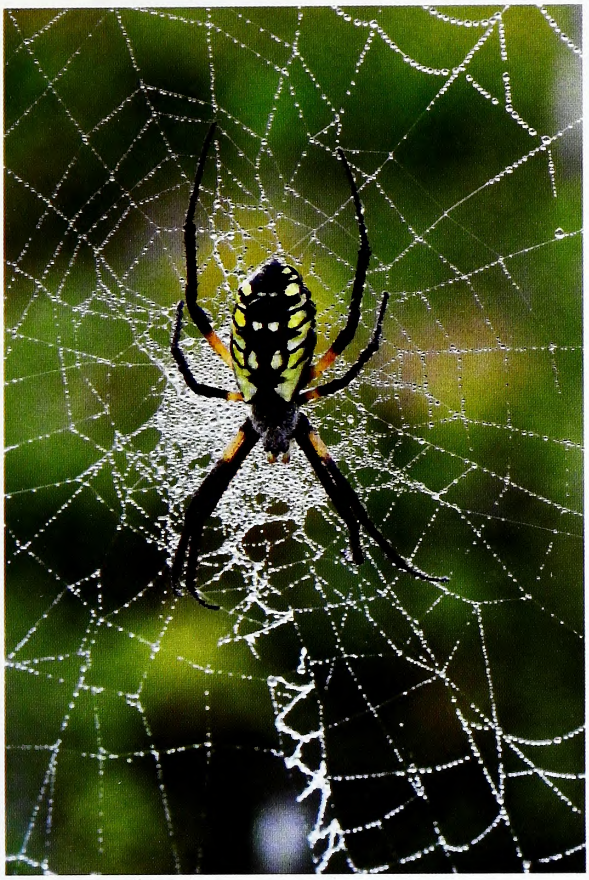
In a simple but effective composition, Carter's image of a bug in his backyard makes a strong statement with three bold colors.



INVERTEBRATES **HONORABLE MENTION**

Bradley Lewis, Cary
Urban mantis, Raleigh

Clinging to the exterior of the photographer's downtown Raleigh office building, this large praying mantis proved to be a patient model. Lewis enjoys macrophotography of wildlife and other subjects.



INVERTEBRATES **HONORABLE MENTION**

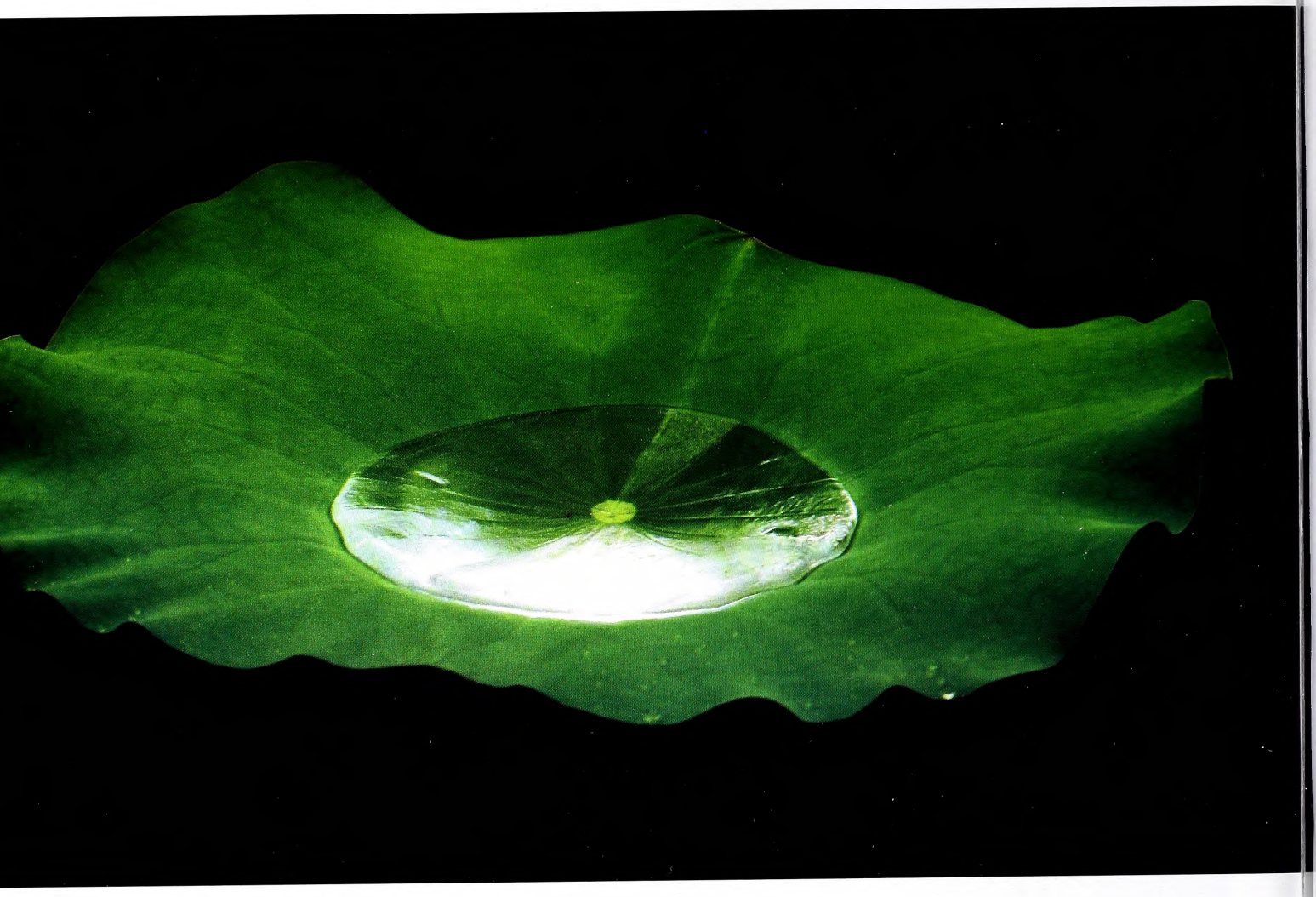
Juan Pons, Pittsboro
Argiope spider, Orange County

The photographer achieved excellent depth of field in this image. Droplets clinging to the web are as sharp as the spider's body.

INVERTEBRATES **THIRD PLACE**

Mona Sadler, Alliance
Dragonfly silhouette, Reelsboro

This moody shot was taken in a wetlands area after the sun set on a warm, humid day. Wildlife photography is a way to enjoy the outdoors for Sadler and her family.



WILDFLOWERS & FRUITS **FIRST PLACE**

Robert Beckman Breen, Chapel Hill
American lotus, Fort Fisher

Although an admitted rookie in photography, Breen won first place with this haunting image of an American lotus in the rain near Kure Beach.

WILDFLOWERS & FRUITS
SECOND PLACE

David Blevins, Fuquay-Varina
Barbara's buttons, Pender County

Blevins successfully captured the intricate beauty of the wildflower Barbara's buttons on a trip to the B. W. Wells Savannah.

WILDFLOWERS & FRUITS
THIRD PLACE

Frank Ripp, Whispering Pines
Longleaf pine, Whispering Pines

The color in Ripp's photograph of longleaf pine catkins—the male flowers—is intensified by lighting conditions.

WILDFLOWERS & FRUITS
HONORABLE MENTION

David Blevins, Fuquay-Varina
Lighted morning glory, Raleigh

Even the most common of flowers can make a great photograph, as Blevins reveals in this shot of a morning glory.

WILDFLOWERS & FRUITS
HONORABLE MENTION

Jeffrey Lewis, Manteo
Lady slippers, Roanoke Island

Lewis reveals the delicate beauty of pink lady slippers, a member of the orchid family, growing in the Elizabethan Gardens.

OUTDOOR RECREATION **FIRST PLACE**

Robert Hanson, Garner
Putting out decoys in fog, Currituck Sound

Shotgun in one hand, camera in the other, Hanson snapped this iconic image of Currituck duck hunting on New Year's Day 2005. He and his hunting party waited an hour and a half for the fog to lift so they could leave the dock, only to have it set in again once they got to their blind.

OUTDOOR RECREATION
SECOND PLACE

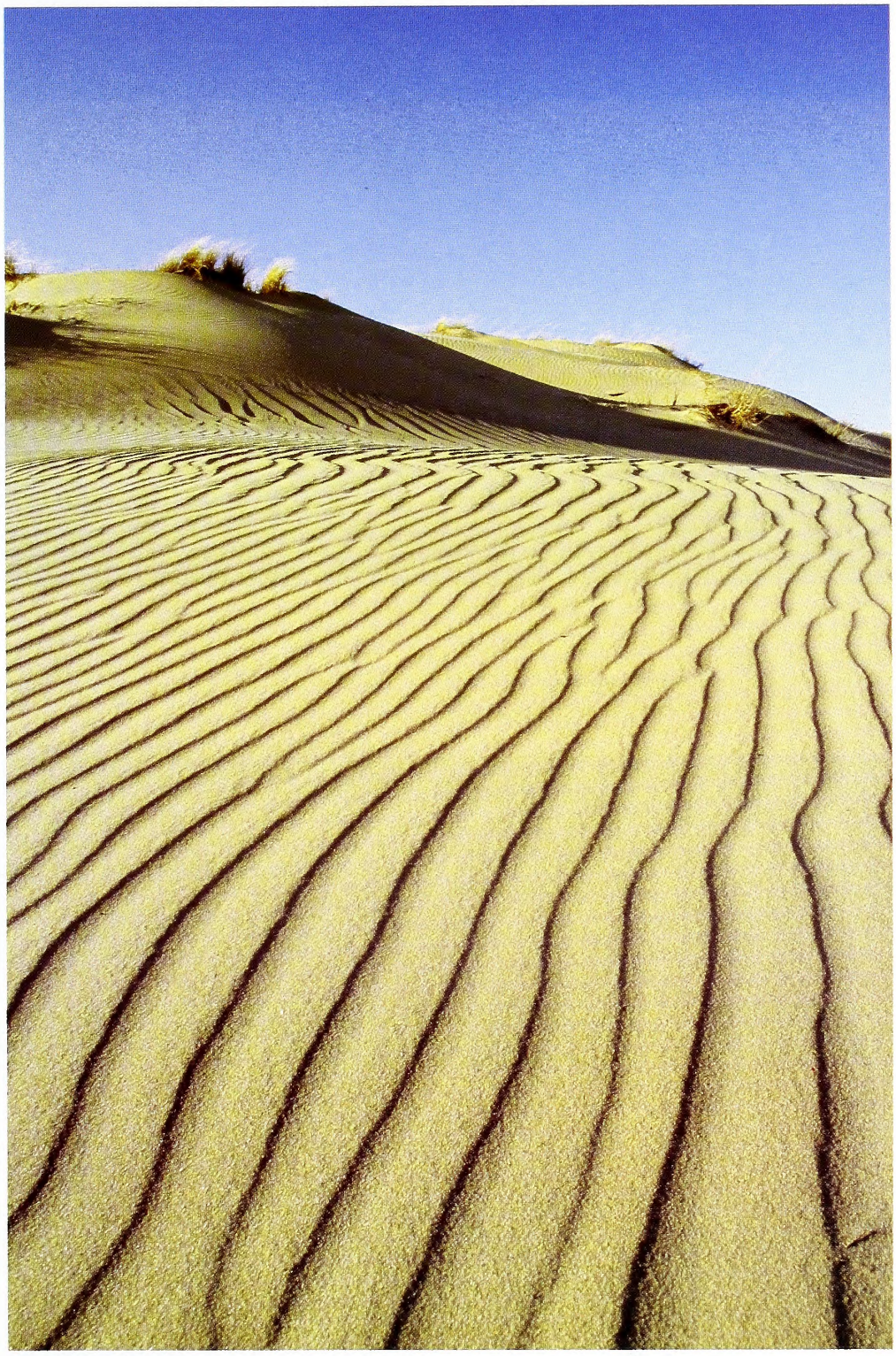
Chip Laughton, Zirconia
Rainbow trout, Pisgah National Forest

While fishing with a friend in a delayed-harvest trout stream in May 2005, Laughton captured all the colors of this fine rainbow.

OUTDOOR RECREATION
THIRD PLACE

Derek Falzarano, Apex
Long day boating, Raleigh

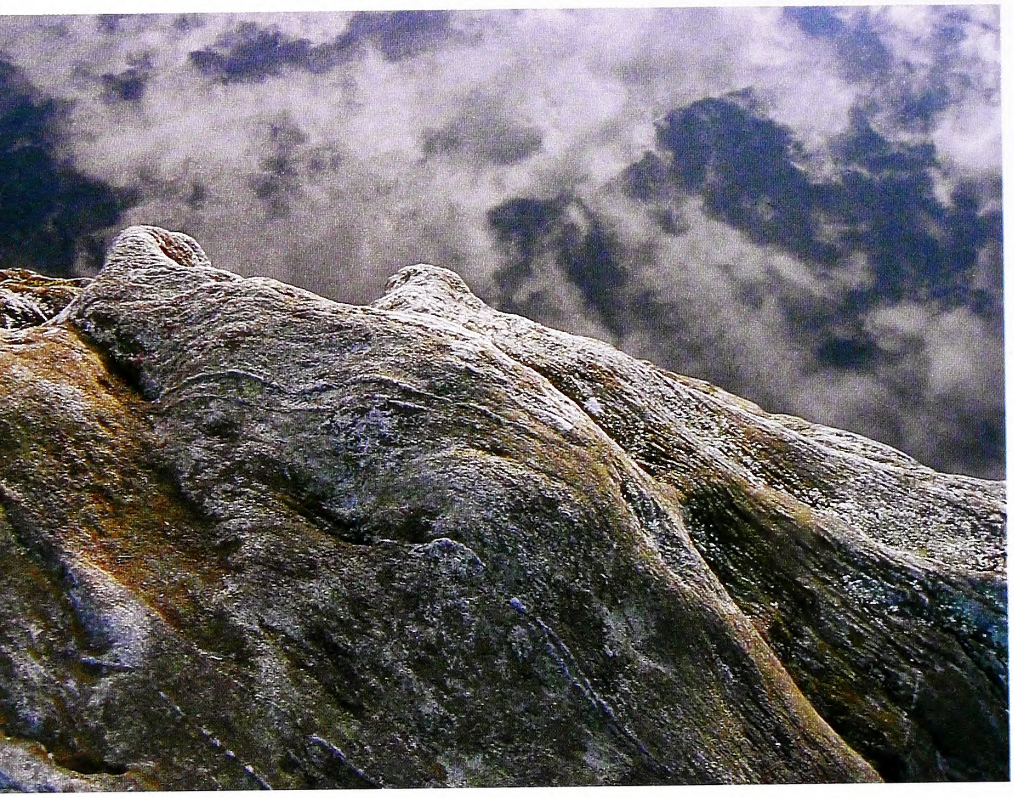
The mood as the sun set on Lake Wheeler "just caught my eye," said Falzarano. The angles of objects around the boathouse add interest to this composition.



PEAKS, VALLEYS & PLAINS
FIRST PLACE

David Blevins, Fuquay-Varina
Rippled dune, Jockey's Ridge State Park

On a March trip to the Outer Banks, Blevins created a mood of solitude in his portrayal of the windswept beauty of the rippled dunes at Jockey's Ridge.



PEAKS, VALLEYS & PLAINS
SECOND PLACE

Dilip Barman, Durham
Sky reflected in Price Lake, Blowing Rock

Standing on a rock on the edge of the lake in October 2004, Barman noticed the reflection of the sky on the water. Looking straight down, he saw the "mountain" and knew the textures and composition would make a fascinating image.

PEAKS, VALLEYS & PLAINS
HONORABLE MENTION

Robert Storm Burks, St. Augustine, Fla.
Mountainscape, near Mt. Mitchell

Burks was driving the Blue Ridge Parkway in July 2005 when he noticed storm clouds moving in over the mountains. He hiked down a hillside and got a great black-and-white photo before the downpour began five minutes later.

PEAKS, VALLEYS & PLAINS
THIRD PLACE

Paul Grecian, Quakertown, Pa.
Boardwalk and beach, Duck

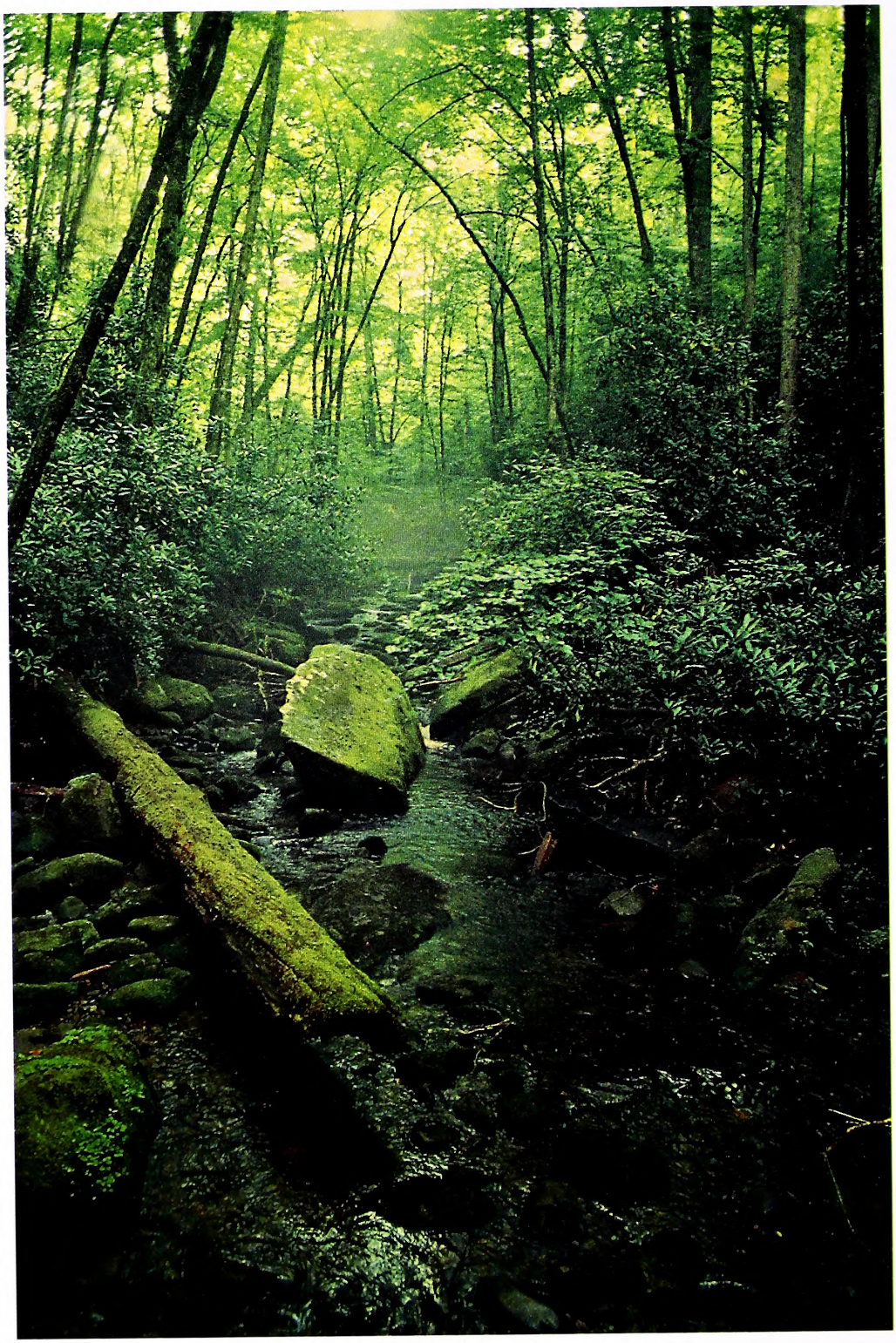
Photographs taken at twilight or dawn can be very dramatic but difficult to expose. Grecian evokes the beginning of night with a sliver of reflected light intersecting the darkened boardwalk.

PEAKS, VALLEYS & PLAINS
HONORABLE MENTION

David Blevins, Fuquay-Varina
Live oaks, Fort Fisher

Blevins' photograph caught the filtered sunlight and the wild, windswept look of live oaks.

HABITATS OF CONCERN WILDLIFE IN NORTH CAROLINA PHOTO COMPETITION 2005



HABITATS OF CONCERN **FIRST PLACE**

Ashley Fetner, Asheboro
Joyce Kilmer Forest, Graham County

Joyce Kilmer Forest is famous for its old-growth poplar trees, but its mountain cove communities are home to a vast number of species. This photograph maintains a focal point while suggesting high biodiversity.

HABITATS OF CONCERN
SECOND PLACE

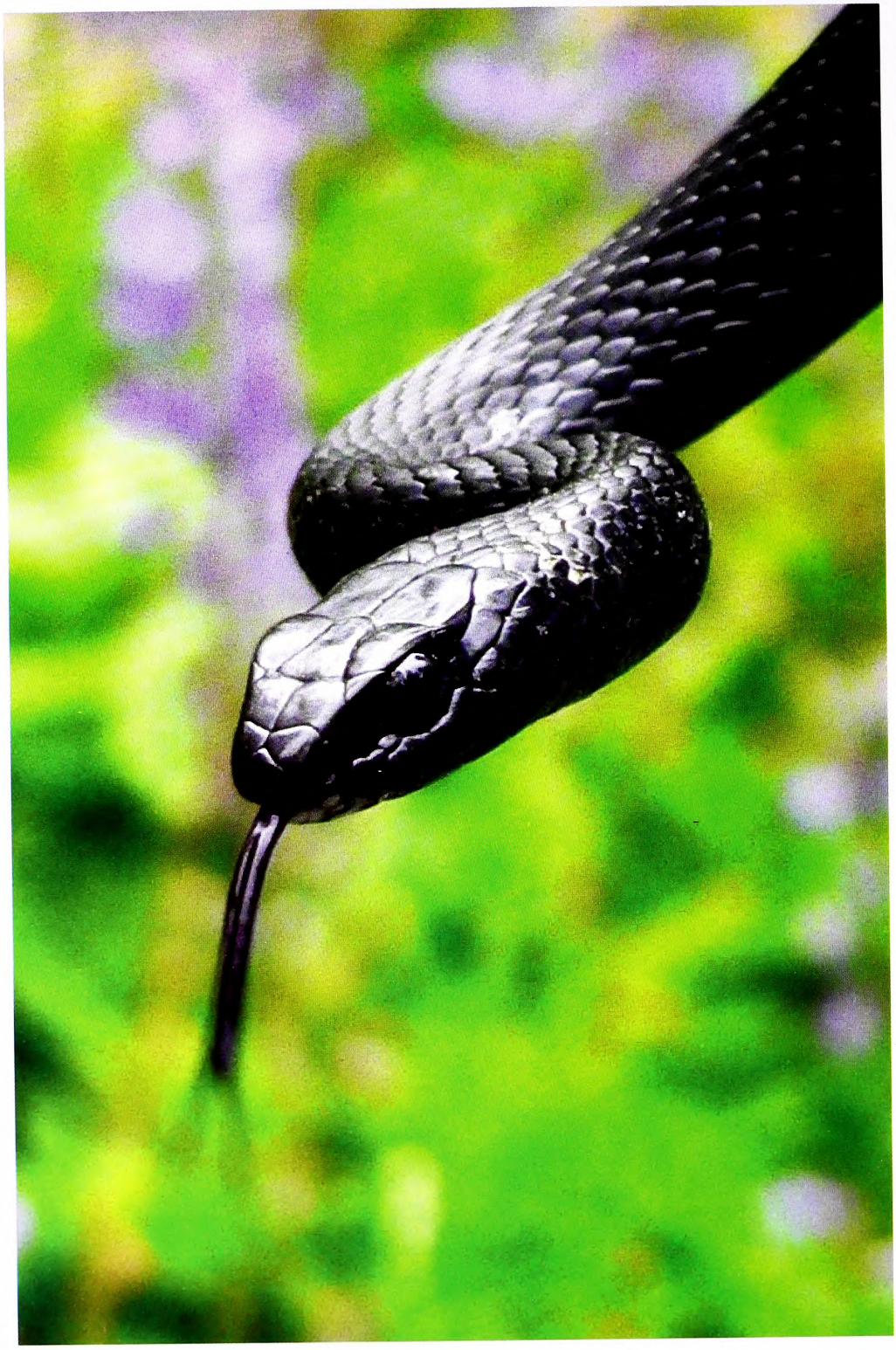
Kelly Dixon, Leland
Longleaf pine savanna, Brunswick County

The open, parklike nature of a savanna in the Green Swamp is expressed in this photograph of yellow pitcher plants.

HABITATS OF CONCERN
THIRD PLACE

Monty Combs, Wilkesboro
Wild horses, Shackleford Banks

A strip of land sandwiched between sky and sea suggests the elemental existence of the wild horses of Cape Lookout National Seashore.



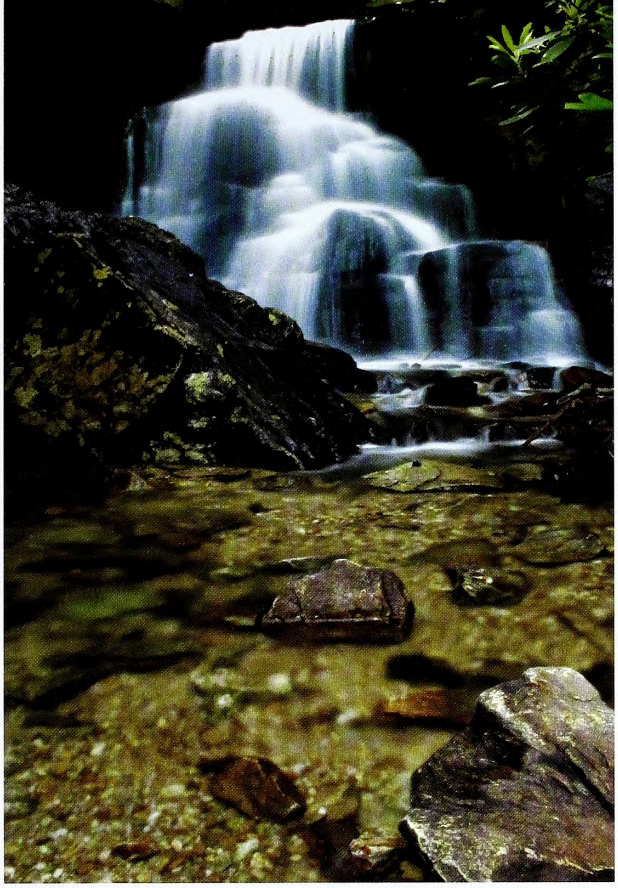
YOUTH PHOTOGRAPHER 13–17

FIRST PLACE

Mikaela Mroczynski, Cary

Black racer, Carolina Beach State Park

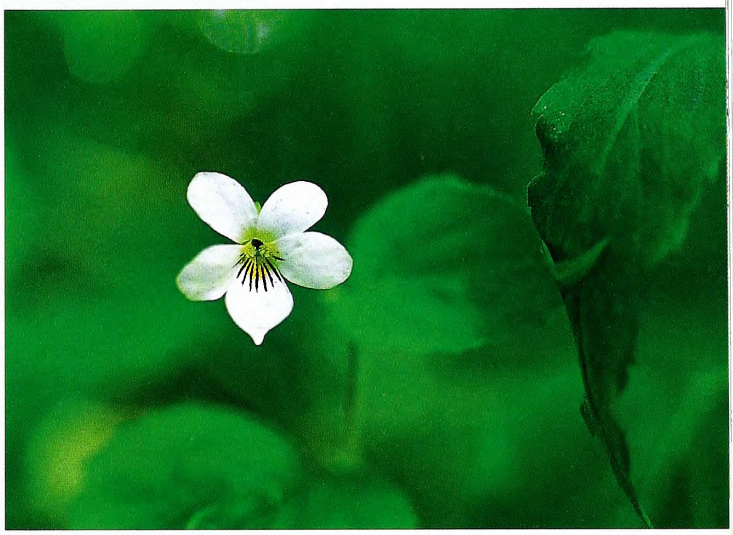
Mroczynski, a 15-year-old college student, earned first place with her vivid portrait of a black racer taken near Carolina Beach with the aid of a friend and a snake stick.



YOUTH PHOTOGRAPHER 13–17
SECOND PLACE

Benjamin Ritner, High Point
Waterfall, Hanging Rock State Park

Ritner's photograph from below the Lower Falls at Stone Mountain freezes the ethereal nature of the scene.



YOUTH PHOTOGRAPHER 13–17
THIRD PLACE

Maribeth Galie, Kernersville
Wildflower, Joyce Kilmer Forest

Amid the towering trees in Joyce Kilmer Forest, Galie concentrated on smaller beauty and came away with this shot of a white violet.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

Benjamin Ritner, High Point
Fall color, Linville Gorge

Ritner, 16, recorded this mountain scene with a few wispy clouds on a trip to Linville Gorge.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

Maribeth Galie, Kernersville
Moth on moss, Joyce Kilmer Forest

Galie's photograph of a moth on moss reveals the contrast in texture and color.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

Johnny Nurney III, Greensboro
Gull, Emerald Isle

Nurney captured the grace of this laughing gull as it snatched a meal from the ocean.

YOUTH PHOTOGRAPHER 12 & UNDER
FIRST PLACE

Nathanael Gass, Durham
Dragonfly, Elizabeth City

Nathanael captured this dragonfly in his grandparents' herb garden at their home near the Pasquotank River. This was one of the first images that Nathanael, now an avid photographer, had ever taken.

YOUTH PHOTOGRAPHER 12 & UNDER
SECOND PLACE

Todd Fishman Elliott, Union Mills
Rose mallow, Rutherford County

Todd photographed these rose mallow blossoms in Painters Gap during August 2005. He found them growing in a small bog.

YOUTH PHOTOGRAPHER 12 & UNDER
THIRD PLACE

Lucas Bobay, Holly Springs
Anole, Holly Springs

Lucas captured this anole on a maple tree in his backyard in September 2005.

YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

Johnsie Sailors, Lawndale
Laughing gulls, Long Beach

Johnsie and her family were feeding these gulls when she snapped this photo during the summer of 2005.

YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

Elizabeth Marshall, Greensboro
Chipmunk, McLeansville

Elizabeth captured this personality-packed chipmunk during a photography seminar in January 2005.

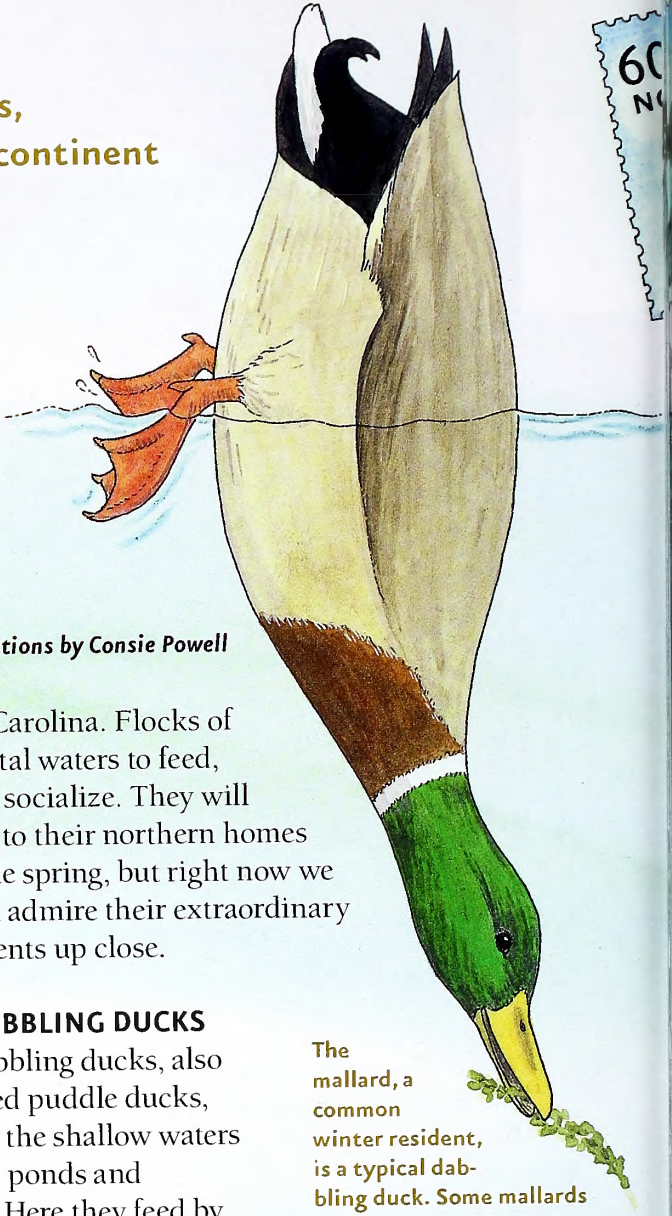
YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

Lucas Bobay, Holly Springs
Frog, Holly Springs

Another nice photo by Lucas shows a frog in a small pond. The frog let him get within 4 inches before hopping off.

Diving deep for fish, dabbling for waterweeds, flying thousands of miles across our vast continent twice each year . . . these plucky little waterfowl are

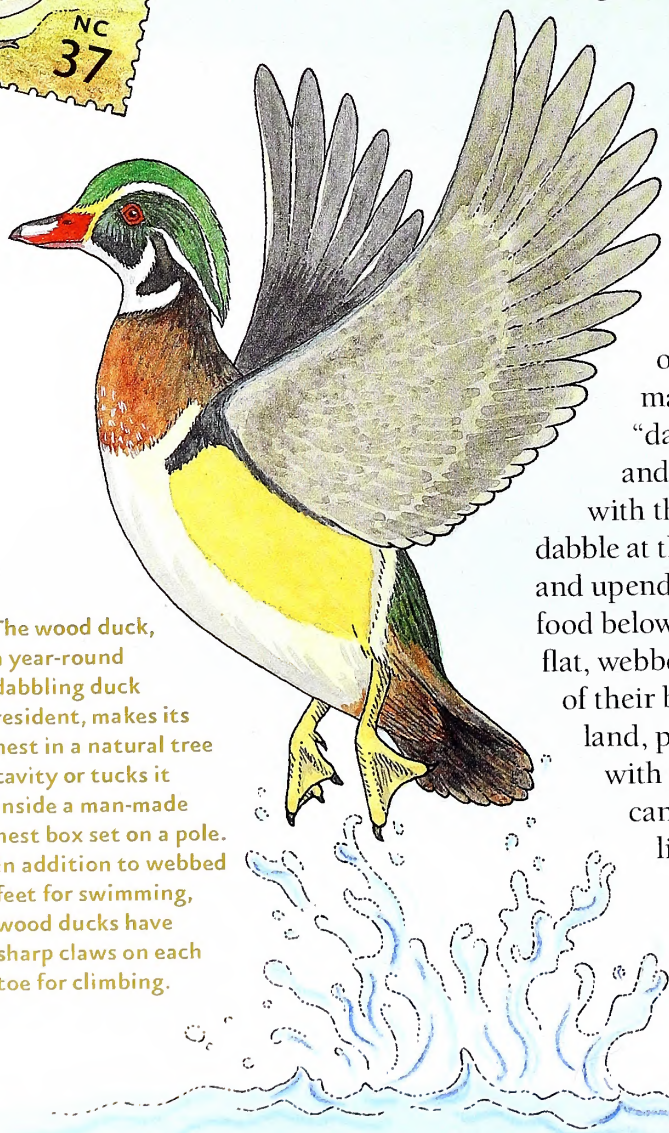
Just Plain Ducky



text and nature activity by Anne M. Runyon / illustrations by Consie Powell

Winter time is duck time in North Carolina. Flocks of web-footed visitors settle on coastal waters to feed, grow fat and socialize. They will return to their northern homes in the spring, but right now we can admire their extraordinary talents up close.

The mallard, a common winter resident, is a typical dabbling duck. Some mallards stay year-round, hiding their feather-lined nests on the ground in freshwater marshes.



The wood duck, a year-round dabbling duck resident, makes its nest in a natural tree cavity or tucks it inside a man-made nest box set on a pole. In addition to webbed feet for swimming, wood ducks have sharp claws on each toe for climbing.

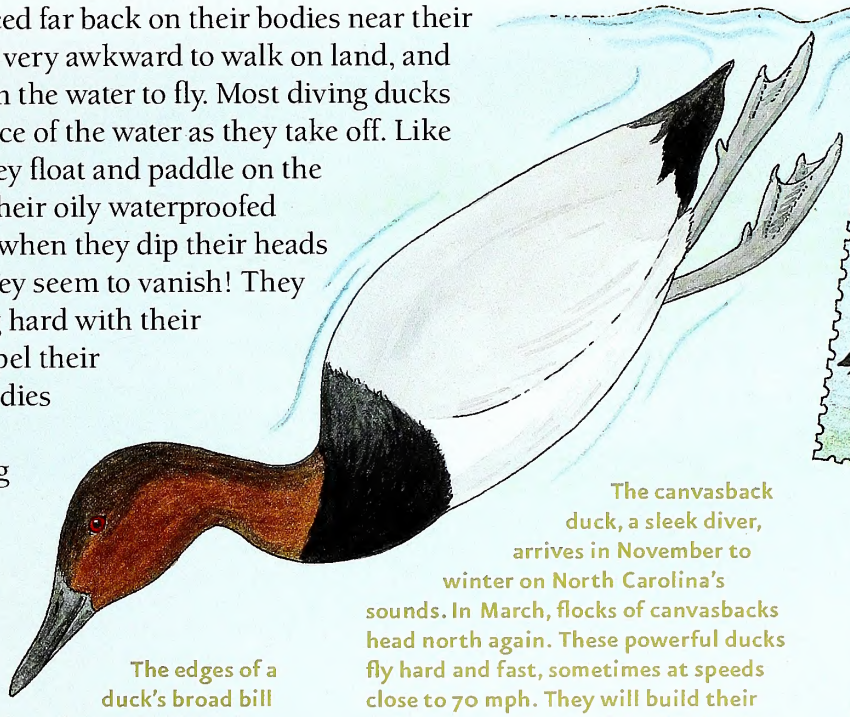
DABBLING DUCKS

Dabbling ducks, also called puddle ducks, prefer the shallow waters of small ponds and marshes. Here they feed by "dabbling" or nibbling plants and small aquatic animals with their broad bills. They dabble at the surface for duckweed and upend themselves to reach for food below. Their short legs with flat, webbed feet are near the center of their bodies. They waddle on land, paddle on water and lift off with powerful wing beats. They can rise almost straight up like a helicopter. They do not dive or swim underwater very well.

DIVING DUCKS

Diving ducks prefer the deeper waters of lakes, sounds, bays, inlets and the ocean. Here they feed by diving underwater for aquatic plants and animals. Some also dabble in shallow water. Diving ducks' legs are placed far back on their bodies near their tails. This makes it very awkward to walk on land, and hard to rise up from the water to fly. Most diving ducks run along the surface of the water as they take off. Like dabbling ducks, they float and paddle on the surface, secure in their oily waterproofed feathers. However, when they dip their heads under the water, they seem to vanish! They dive down, kicking hard with their webbed feet to propel their torpedo-shaped bodies rapidly. They hunt for bottom-dwelling plants, or fish and other animals, before resurfacing. Some diving ducks can travel 300 feet underwater before coming up to breathe.

Male ducks are usually more colorful and make softer, more musical sounds than females. Female ducks quack, squawk or squeal.

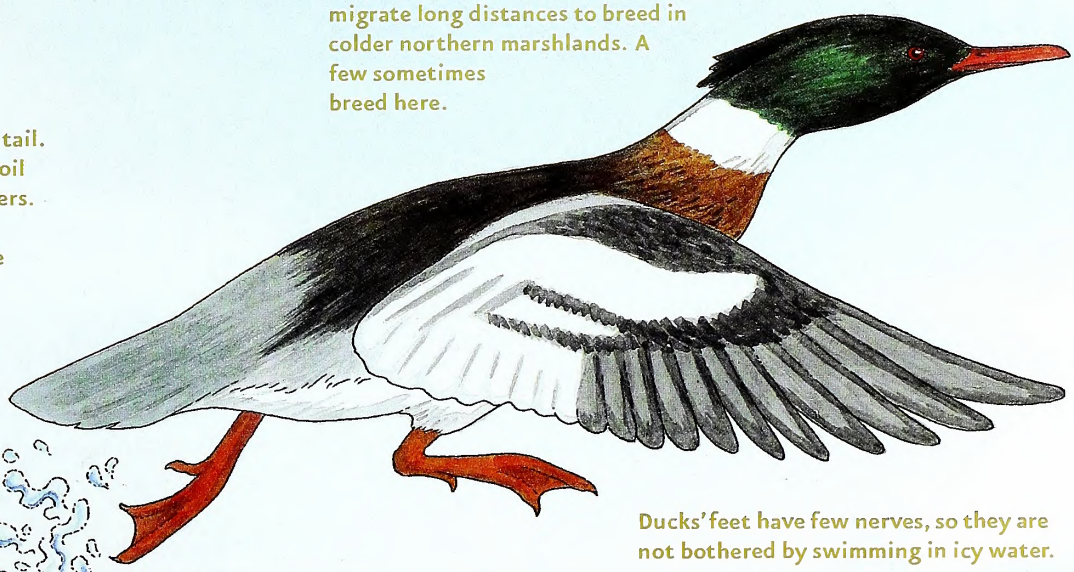


The canvasback duck, a sleek diver, arrives in November to winter on North Carolina's sounds. In March, flocks of canvasbacks head north again. These powerful ducks fly hard and fast, sometimes at speeds close to 70 mph. They will build their nests among the cattails and bulrushes of North Dakota, Canada and Alaska.

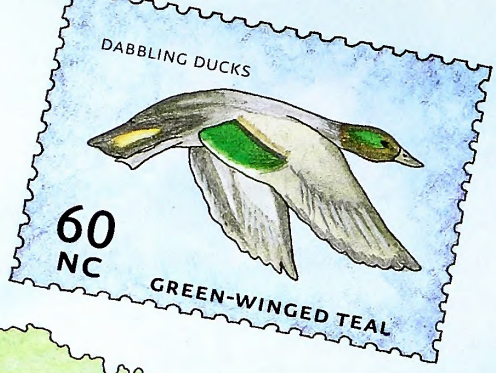
The edges of a duck's broad bill have ridged plates called lamellae. The lamellae grip slippery tidbits and strain small foods from the water.

Come spring, most of North Carolina's migratory ducks, like this red-breasted merganser, will migrate long distances to breed in colder northern marshlands. A few sometimes breed here.

A duck rubs its broad bill across an oil gland near its tail. Then it preens, smoothing oil over its sturdy outer feathers. Protected by these waterproofed outer feathers, the duck's fluffy inner layer of downy feathers stays dry, keeping the duck warm.



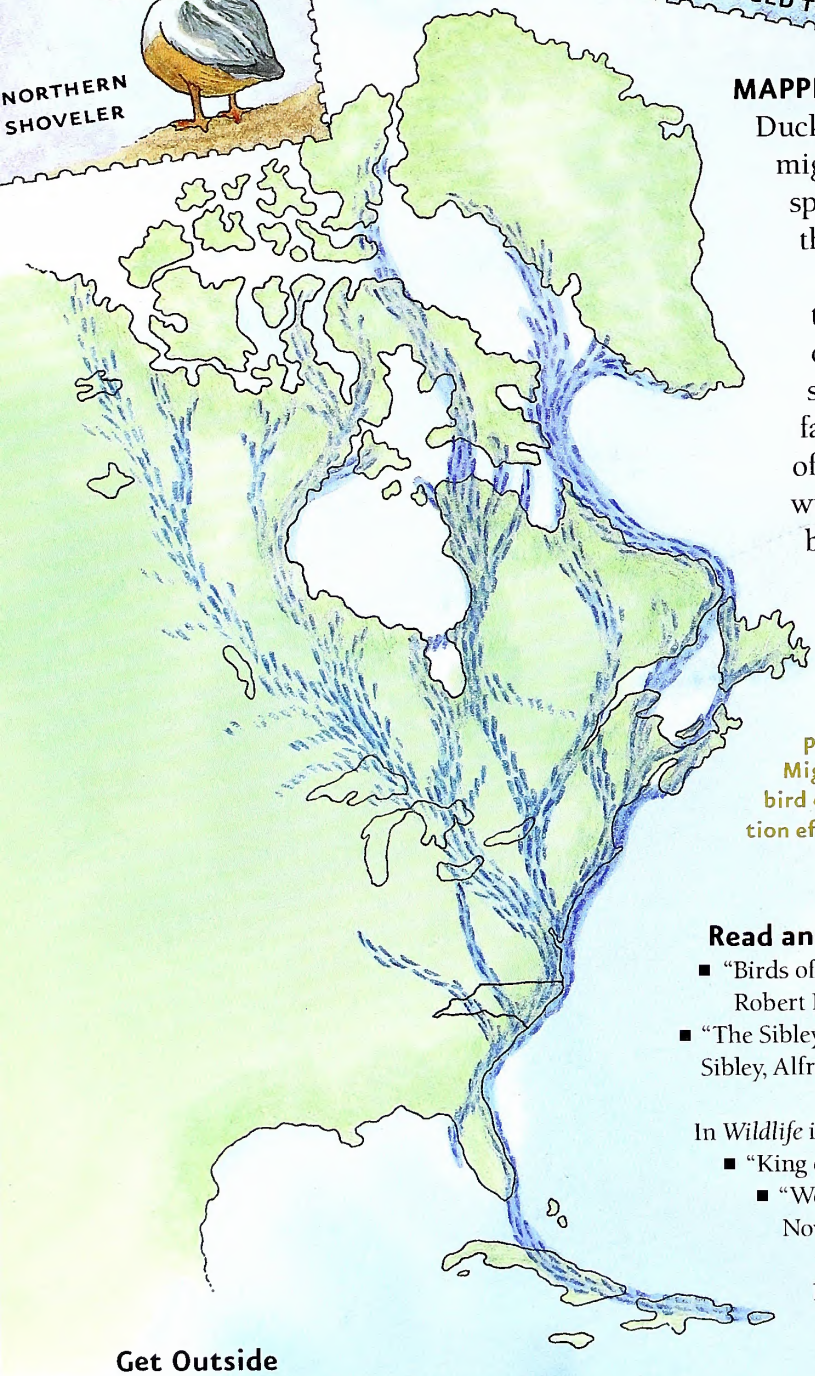
Ducks' feet have few nerves, so they are not bothered by swimming in icy water.



MAPPING MASTERMINDS

Ducks share an extraordinary talent with other migratory birds. Some long-distance migratory species can remember details needed to map out their migratory routes.

As they leave the summer breeding ground in the north, young ducks of some species learn countless details of terrain, in relation to sun and star positions, as they fly south during their first fall migration with the adult ducks. A memory of this route is stored in the duck's brain. Even without the adults, these young ducks can fly back to their birthplace the following spring.



The Atlantic Flyway is one of four migratory routes used by North American ducks. Each January, biologists conduct an aerial waterfowl count in North Carolina as part of the Atlantic Flyway Mid-Winter Waterfowl Survey. Migrating ducks, geese and swans are counted. This annual bird count is important for waterfowl management, conservation efforts and determination of hunting regulations.

Read and Find Out

- "Birds of the Carolinas" by Eloise F. Potter, James F. Parnell, and Robert P. Teulings, University of North Carolina Press, 1980.
- "The Sibley Guide to Birds of Eastern North America" by David Allen Sibley, Alfred A. Knopf, 2003.

In *Wildlife in North Carolina*:

- "King of Ducks" by F. Eugene Hester, February 2003.
- "Wood Boxes for Wood Ducks" by F. Eugene Hester, November 2002.

Movies:

- "Fly Away Home" directed by Carroll Ballard, 1996.
- "Winged Migration" directed by Jacques Perrin, 2001.

On the World Wide Web:

- Ducks Unlimited, Inc.
  www.ducks.org

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Get Outside

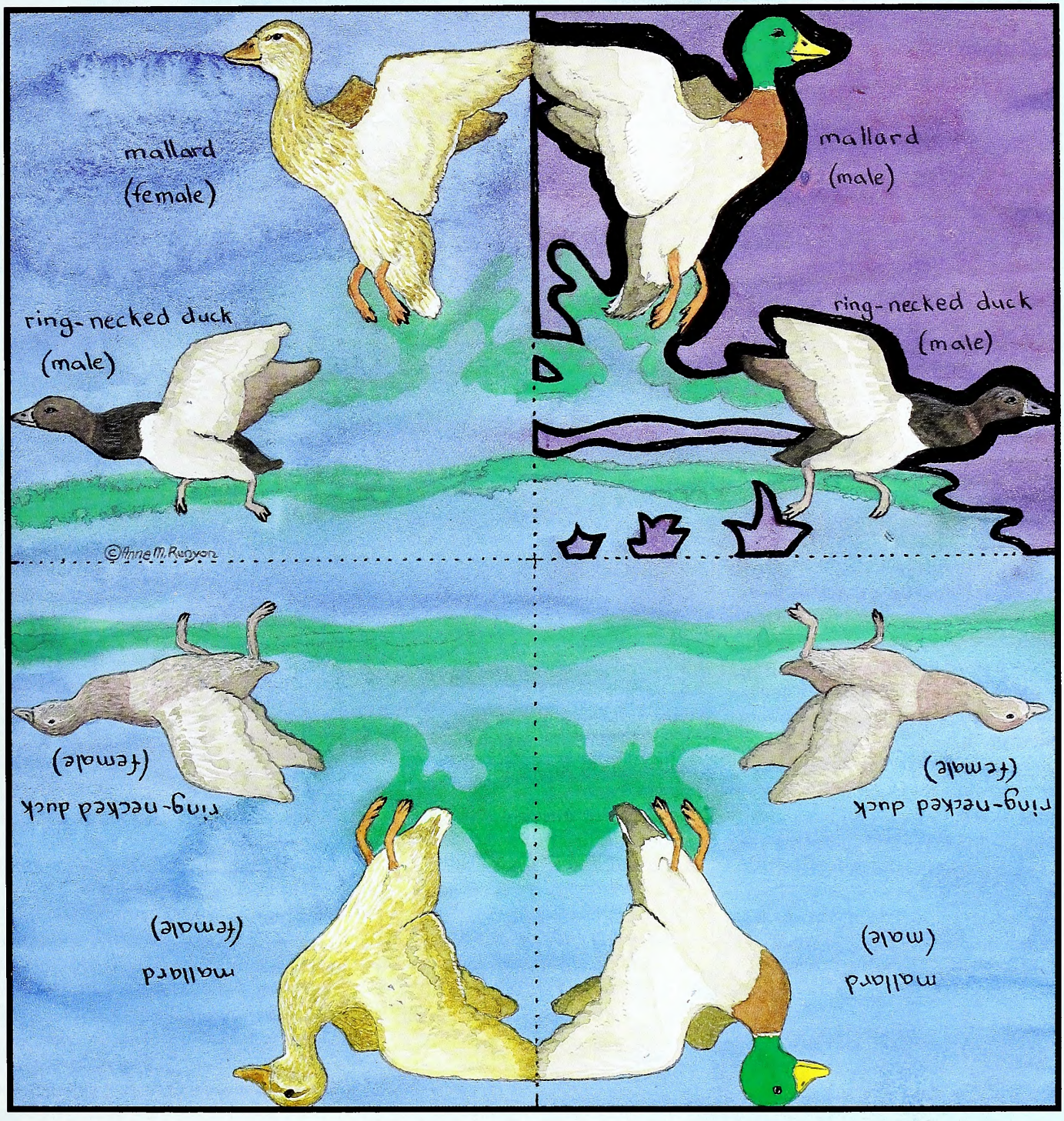
Look for beautiful mallard ducks wintering throughout North Carolina in a variety of freshwater ponds, lakes and marshes.

Try a January visit to freshwater Lake Mattamuskeet. Then take a ferry ride across salty Pamlico Sound to Ocracoke Island. Travel to the marshy Pea Island Wildlife Refuge farther north on the Outer Banks. You will see ducks, geese and swans galore on all of these coastal waters.

Double Duck Blast-Off

A dabbling duck, such as the mallard, can blast straight up from the water. A diving duck, such as the ring-necked duck, must run along the water surface as it gradually lifts off into the air.

1) Cut out rectangle.
2) Fold into four sections along the · · · lines with the dark section on top.
3) Cut along the outside of the thick black lines, cutting away the purple areas.
4) Unfold your double duck blast-off.



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

2005 Turkey Hatch Hits Near Low

North Carolina's cold, wet spring of 2005 was a particularly nasty one for young wild turkeys. Following the annual summer brood survey, N.C. Wildlife Resources Commission upland game bird biologist Mike Seamster found that the state had recorded its second-poorest hatch ever.

NCWRC

The 1,200 participants in the survey observed 5,636 wild turkeys during the summer. Only 53 percent of the hens had poults (young turkeys), indicating poor nesting success. In 2003, the worst year ever, just 51 percent of the hens were seen with poults. In 2004, 70 percent of the hens were observed with poults.

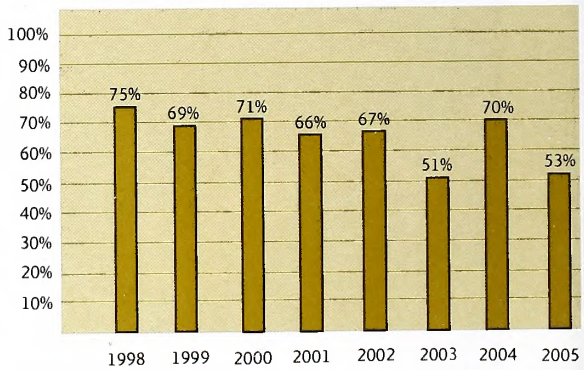
In addition to recording the number of hens with poults, the brood survey shows the average number of poults per brood, which reveals poult survival rates, and the average number of poults per hen, which is an indication of overall productivity. In 2005, the number of poults per brood was 3.3, only a fair survival rate, and the number of poults per hen was 1.7, which is poor overall production.

Besides the weather, another factor in the poor production of 2005 was the lack of 2-year-old birds in the population. Studies have shown that 1-year-old birds (in this case, those hatched in 2004) are not as successful nesters as 2-year-old hens, especially when the birds are confronted with difficult weather conditions. And because the hatch of 2003 was very small, there were fewer of those more mature hens in the spring of 2005.

The modest hatch will have little effect on the winter either-sex season (Jan. 16–21 in 10 counties) or the spring bearded-turkey-only season (April 8–May 6), but the lack of birds will show up eventually. "The poor hatch in 2005 will mean fewer jakes [juvenile males] in the harvest this year," Seamster said. "However, there should be a good number of 2-year-old birds in the population from the good hatch in 2004. They [2-year-old gobblers] are usually the easiest birds to harvest, so we should have a good spring season in 2006. The poor hatch this year will mean fewer 2-year-old birds in the population for the spring of 2007."

Just how much of an effect this year's hatch will have on future turkey seasons also depends on the 2006 hatch. "We had a poor hatch in 2003, so we had few 2-year-old gobblers in the population in 2005," Seamster said. "However we had a good hatch in 2004, so there were lots of jakes in 2005. The total harvest was actually up from 2004 because we had a record number of jakes in the harvest. The worst-case scenario would be to also have a poor hatch in 2006, which would mean few 2-year-old gobblers and few jakes in the population for the spring of 2007. Two or three consecutive poor hatches would have a major impact on the population and the harvest."

Hens with Poults



ON PATROL

ILLUSTRATED BY JACKIE PITTMAN

Wildlife Officer Kenneth Blankenship located a bait site several days before the opening day of turkey season. He went back to check the area on Friday before opening day and found fresh cracked corn and decoys set up within gun range of a renovated barn.

Blankenship sent Sgt. Dennis Mehl to the area the next morning. The hunters showed up around 10 a.m. dressed more for golf than hunting. They went into the barn's loft and sat on a sofa overlooking the baited area. The men called several times, and Sgt. Mehl could hear them debating whether they were wasting their time. When approached, the hunters were not concerned about receiving citations. Instead, they were worried about missing their upcoming tee time. All pleaded guilty.

Commisssion Sets Public Hearings

North Carolina outdoorsmen will get the opportunity to voice their opinions about proposed changes in hunting and fishing regulations this month in a series of nine public hearings conducted by the N.C. Wildlife Resources Commission.

Among the changes proposed by the commission is a moratorium on the taking and possession of river herring from inland waters of coastal rivers and their tributaries up to the first impoundments of the main rivers. Currently, anglers fishing inland waters may take 25 river herring, which is a collective term for blueback herring and alewife. The two species have declined precipitously over the past few decades in their native waters. While river herring have recreational fishing value, they are sold mainly for their roe and are used as crab pot bait and pet food. They are a very important forage fish for several game fish, including striped bass, largemouth bass and some catfish species.

The commission also would like to establish a 14-inch minimum size limit and a creel limit of eight fish per day in inland waters for flounder. The current limits are 13 inches with no restriction on take. Commission staff has recommended changing the creel and size limits for striped bass at Kerr Lake. Fishermen now may keep four fish per day with a minimum size of 20 inches. If approved, Kerr Lake would operate with a 26-inch minimum and two fish per day limit from Oct. 1–May 31, and no minimum size and four fish per day from June 1–Sept. 30.

Among the possible changes in hunting regulations up for consideration is the harvest of male turkeys or bearded turkeys during the spring season. This change would make the occasional beardless male and the occasional bearded hen legal. The commission also is proposing to allow the hunting of coyotes at night using red or amber lights during times that do not coincide with deer seasons.

A complete list of proposed changes is available at www.ncwildlife.org. The list also may be obtained at the hearings, held at the following locations:

Jan. 9 Bladen Co. Courthouse, Elizabethtown
Jan. 11 Alamance Co. Courthouse, Graham
Jan. 12 South Stanly High School, Norwood
Jan. 17 Morganton Municipal Auditorium, Morganton
Jan. 18 Southwest Community College, Sylva
Jan. 19 Starmount High School, Boonville
Jan. 24 Swain Auditorium, Edenton
Jan. 25 Craven Co. Courthouse, New Bern
Jan. 26 Annex Building, District Court Room, Louisburg

All hearings begin at 7 p.m. Check www.ncwildlife.org for possible changes in the public hearings schedule.

CALENDAR OF EVENTS

Friday, Jan. 20

Learn about waterfowl from 9 a.m.–noon with the N.C. Maritime Museum in Beaufort. After viewing slides of birds, participants will take a field trip to nearby bird-watching hotspots. Visit www.ah.dcr.state.nc.us/sections/maritime/default.htm or call (252) 728-7317.

Saturday–Sunday, Jan. 28–29

Stop by Raleigh's N.C. Museum of Natural Sciences for Astronomy Days, featuring presentations, exhibits and activities. Visit www.naturalsciences.org or call (919) 733-7450.

Saturday, Feb. 4

Take in Winter Open House—Trash Blast! at Blue Jay Point County Park in Raleigh. Enjoy exhibits and activities all about trash and recycling, from crafts to composting to the Kid's Recycling Challenge. Visit www.WakeGov.com or call (919) 870-4330.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

N.C. Wildlife Action Plan Gets First Nod

NCWRC

North Carolina was the first state in the nation to receive approval for its Wildlife Action Plan—a long-term strategy to conserve fish, wildlife and natural areas to enhance wildlife populations and the quality of life for North Carolinians. State fish and wildlife agencies across the country are developing similar rigorous, science-based plans to prevent wildlife from becoming endangered.

The U. S. Fish and Wildlife Service approved the N.C. Wildlife Action Plan in August, making North Carolina eligible to receive federal funds through the State Wildlife Grants program beginning in fiscal year 2006. From 2001 to 2005, North Carolina received more than $6.1 million in State Wildlife Grants, which are administered by the N. C. Wildlife Resources Commission.

Wildlife biologists use State Wildlife Grants to support research and management practices that benefit fish, wildlife and their habitats. Efforts will focus on the conservation of a wide variety of nongame animals.

Congress required each state fish and game agency in the United States to develop its own wildlife action plan to remain eligible for federal funding through the State Wildlife Grants program.

The N.C. Wildlife Action Plan can be accessed on the commission's Web site, www.ncwildlife.org, in sections that can be downloaded and saved as PDF files. The plan was the result of a collaboration of scientists, sportsmen and other conservation partners across the state. "The proactive nature of the plan will benefit the health of wildlife and people, and conserve wildlife species before they become more rare and more costly to protect," said Salinda Daley, who coordinated the N.C. plan.

Hunters for the Hungry Receive Aid

Hunters helping to put food on tables other than their own will get a boost. A newly forged partnership with N.C. Hunters for the Hungry calls for the N.C. Wildlife Resources Commission to provide the nonprofit organization with up to $30,000 annually to process donated deer meat. Last year N.C. Hunters for the Hungry provided more than 44,000 pounds of ground venison to food banks and shelters across North Carolina.

Besides assisting a worthy cause, the Wildlife Commission is contributing to its own resource conservation goals. Hunting has proven to be the surest and most cost-effective method for managing white-tailed deer populations. But hunters who have exceeded their "freezer limit" have little incentive to take more deer, said David Cobb, chief of wildlife management for the commission. "Hunters for the Hungry gives our hunters a place to donate harvested white-tailed deer," Cobb said. "This helps in the management of our white-tailed deer resource across the state."

Taking Aim Against Hunger

The 19 wildlife commissioners unanimously approved a formal, five-year agreement with N.C. Hunters for the Hungry. The memorandum stipulates that all commission funding must go directly toward processing the deer meat and not for administration or other expenses.

Despite relying mostly on donors, volunteers and word of mouth, the group in its 12 years of existence has donated more than 234,000 pounds, or 117 tons, of deer meat to hunger-relief organizations statewide—from community food banks and Salvation Army chapters to church pantries and homeless shelters. For more information about N.C. Hunters for the Hungry, log onto www.dixiedeerclassic.org.

IN SEASON

This month, these hunting seasons are open in North Carolina:

Bear: *See 2005–2006 North Carolina Regulations Digest* for seasons and locations.
Bobcat: Through Feb. 28.
Brant: Through Jan. 28.
Canada Goose: Resident Population Zone through Jan. 28. Northeast Hunt Unit from Jan. 14–31 by permit only.
Common Snipe: Through Feb. 28.
Crow: Wednesday, Friday and Saturday of each week through Feb. 28.
Ducks, Coot and Mergansers: Through Jan. 28.
Fox: *See Regulations Digest* for seasons and locations.
Mourning Dove: Through Jan. 14.
Opossum and Raccoon: Through Feb. 28.
Pheasant: Through Feb. 1.
Quail: Through Feb. 28.
Rabbit: Through Feb. 28.
Ruffed Grouse: Through Feb. 28.
Squirrel: Red and gray season through Jan. 31.
Sea Ducks: Through Jan. 28.
Snow, Blue and Ross' Geese: Through March 4.
Tundra Swan: Through Jan. 31 by permit only.
White-tailed Deer: Gun season through Jan. 2 in Central and East.
Wild Boar: Through Jan. 2
Wild Turkey: Either-sex season runs Jan. 16–21.
Woodcock: Through Jan. 14.

Check the *2005–2006 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Guide Highlights Best Birding Locations

As Harry LeGrand Jr. of the N.C. Natural Heritage Program points out in the foreword to "Birding North Carolina," our state is among the richest in the eastern United States in diversity of bird species, yet it has never produced a birding guide that covers the entire state. Marshall Brooks, Mark Johns and the Carolina Bird Club have filled the hole nicely.

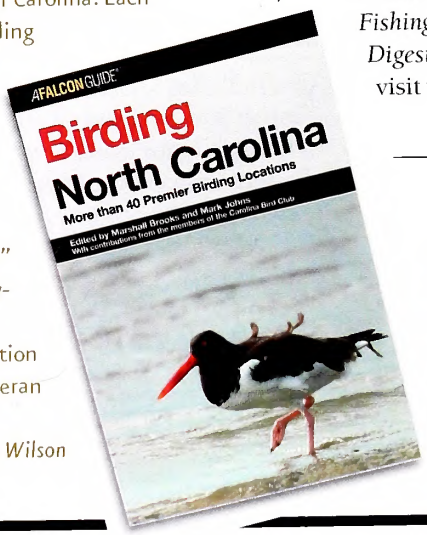
Both editors bring years of experience to the task of instructing birders where to go in search of birds—and just as important, how to get there. Brooks, a professor at N.C. Wesleyan College, conducts breeding bird surveys, monitors migration and is a licensed bander. Johns has been the Partners in Flight biologist for the N.C. Wildlife Resources Commission since 1996 and is the state coordinator of the breeding bird survey.

"Birding North Carolina" covers 44 birding sites across North Carolina. Each site is described in detail by a Carolina Bird Club member, including key species, the best times of the year to bird at the site, hazards to watch out for, and logistics such as where to stay, where to find gas and where to eat.

The editors' descriptions of the state's broad range of bird habitats provides context for the individual sites. The appendices include the official list of the 460 bird species found in the state and a run-down of 122 North Carolina "bird specialties" (species most sought by birders) from alder flycatcher to yellow-bellied sapsucker.

"Birding North Carolina" is well written, packed with information and eminently useful. It should prove indispensable for both veteran and novice birders.

–Jim Wilson

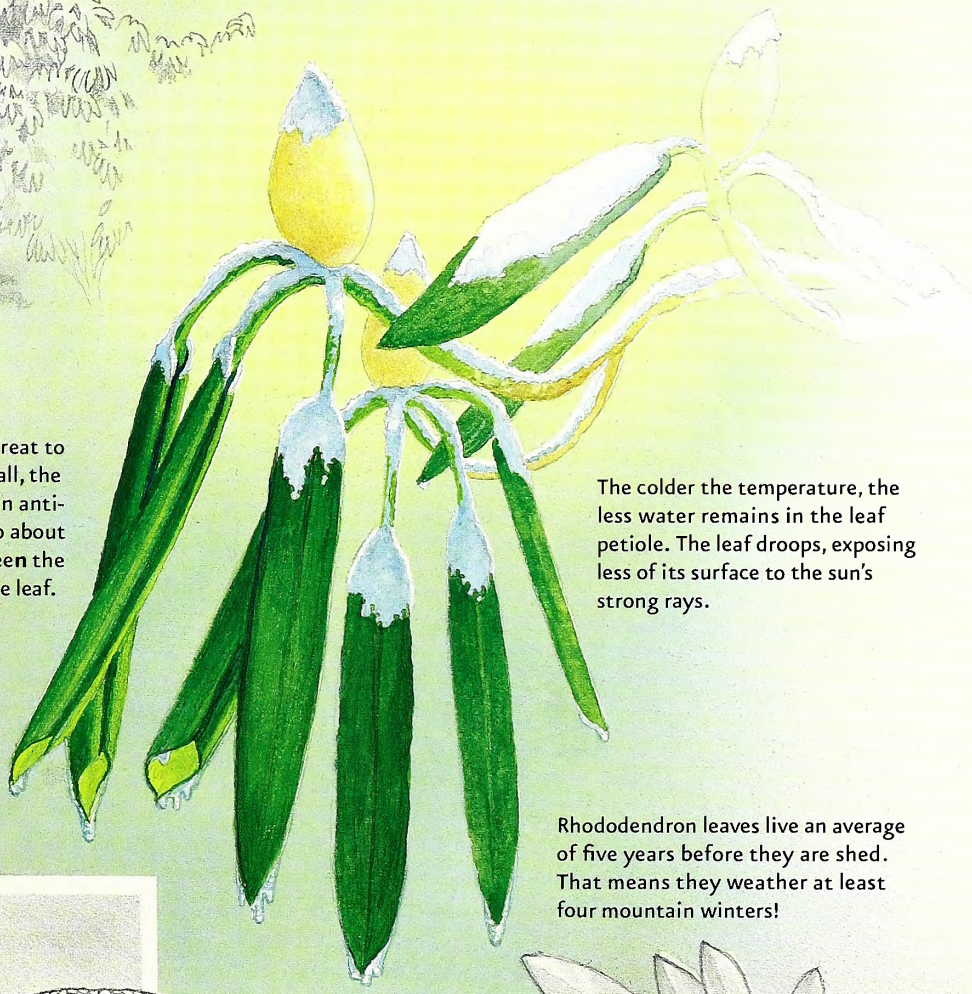


"Birding North Carolina" edited by Marshall Brooks and Mark Johns, The Globe Pequot Press, 2005, $12.95
All the proceeds from sales of this book will go toward bird conservation projects throughout the state.

How Do Rhodies React To Cold?

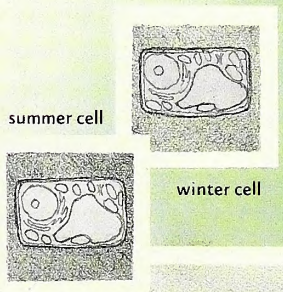
written by Clyde Sorenson
illustrated by David Williams

RHODODENDRONS ARE EVERGREENS with tough, broad leaves that harvest energy from the sun even on mild winter days. But strong sunlight on a very cold day can severely damage their leaf tissues. Rhododendron leaves droop and curl to avoid a bad case of sunburn.

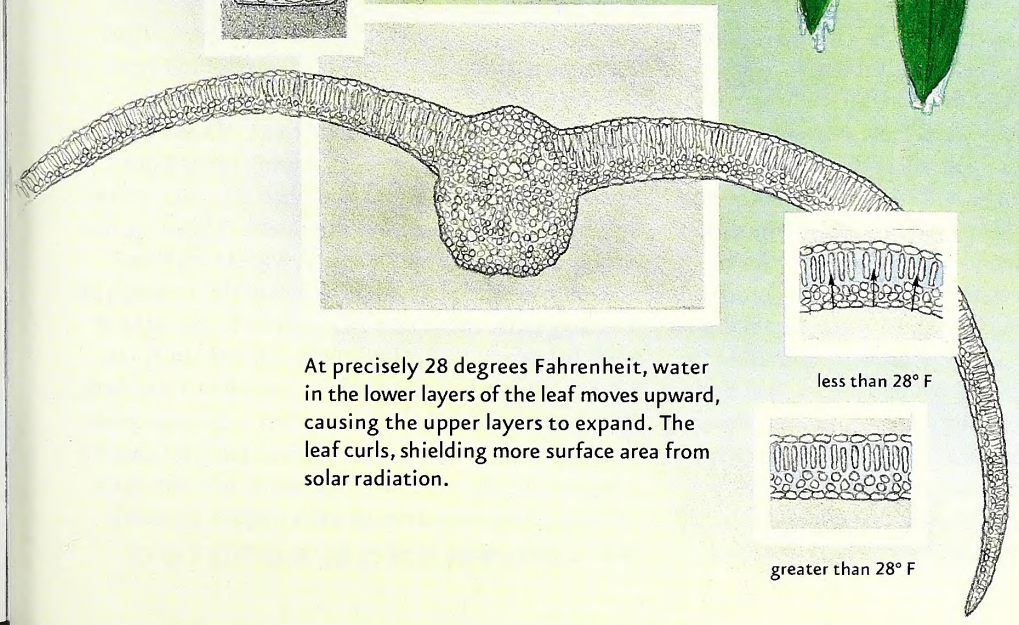


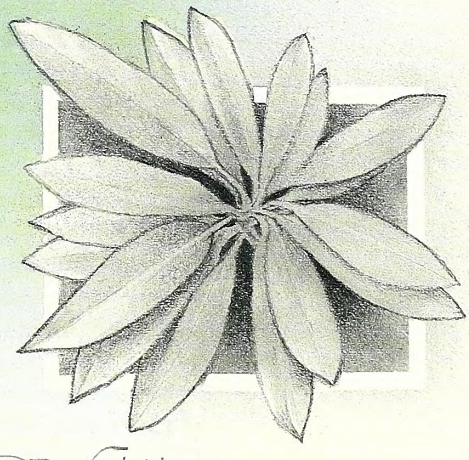
Actual freezing of cells poses little threat to winter rhododendron leaves. In the fall, the plant packs its leaf cells with a protein antifreeze that protects the cells down to about 20 degrees below zero. Water between the cells can freeze without damaging the leaf.

The colder the temperature, the less water remains in the leaf petiole. The leaf droops, exposing less of its surface to the sun's strong rays.



Rhododendron leaves live an average of five years before they are shed. That means they weather at least four mountain winters!





At precisely 28 degrees Fahrenheit, water in the lower layers of the leaf moves upward, causing the upper layers to expand. The leaf curls, shielding more surface area from solar radiation.

Duck Feats

written by Jim Dean

Back in September, I received a letter from an old friend and former co-worker, John Kennedy. John retired years ago from his job as enforcement officer and district supervisor with the N.C. Wildlife Resources Commission, and he and his wife still live in Whiteville. I recall that John became an agency celebrity when he volunteered to go undercover to apprehend some particularly elusive scofflaws who were illegally trapping and selling game fish on Lake Waccamaw. John disguised himself as a hippie with a longhaired wig and a tie-dyed T-shirt, and drove an old van painted in psychedelic colors. He and his "groupie" (an attractive female federal agent whose role did not include cohabitation, alas) infiltrated and arrested the gang of perps. That was back in the 1970s, but I am happy to report that John has not lost his innovative approach to solving problems. Let him pick up the story.

DUCKANEERS OF THE OUTER BANKS

ILLUSTRATED BY JACKIE PITTMAN

"About 10 of us 'has-beens' take a circuitous bicycle trip from Corolla south to the ferry slip on Ocracoke Island each Halloween weekend. We like to say we ride from buffet to buffet. Some years ago, we were pedaling across the bridge from Manteo to Nags Head when each of us observed something so strange that we didn't mention it to the others. At our ages, with stiff necks, we tend to stare at the pavement immediately ahead, and as I started over the bridge, I began to see sun-dried duck feet—only feet, no feathers, beaks, wing bones or carcasses—and there were hundreds of them. On the long Oregon Inlet bridge, I observed the same thing, but since I still seemed to be the only one to notice, I said nothing. Months later, someone in the group finally commented on this oddity, and we all admitted we had seen the same thing. My brother ridiculed me when I told him about it, saying that anyone who had worked for the Wildlife Commission for 30 years should certainly know that ducks shed their feet each October. We will be vigilantly looking for any new distribution of duck feet this fall, but we really would like to hear a more scientific explanation."

"Anyone who had worked for the Wildlife Commission for 30 years should certainly know that ducks shed their feet each October."

I wrote John back, noting that I had frequently observed many dead gulls and other birds that had apparently been struck by vehicles on bridges where they tend to gather. I suggested that scavengers might eat everything but the feet, though that would mean you might anticipate a variety of avian feet, and John's group specified that these were clearly the webbed feet of waterfowl. "Perhaps," I added, "entire migrating flocks of ducks flying tight and low over bridges in poor weather might meet with vehicular misfortune."

While we were on the subject of unexplained waterfowl mysteries, I also asked John if he would care to speculate on how it is possible for coots to migrate thousands of miles when no one has ever seen one fly more than 200 yards, and then only a foot off the water.

John's reply arrived shortly. "As for the ducks, your thoughts led me to the obvious. I visualize large flocks arriving here at night or in dense fog with their landing gear down and locked, only to have their feet sheared off by a bridge railing. Anyway, that's what I'm going to tell the boys at the coffee shop."

John continued. "I also have the answer regarding coots. They don't migrate in the usual way, but are sucked up in violent storms and transported by weather fronts. In other words, it rains coots. In 1955, I was working for the License and Theft Division of the N.C. Department of Motor Vehicles, and was stationed at the truck weighing station on U.S. 70 near Hillsborough.

"Late one rainy night during a lull in the traffic, the concrete approach to the scales was suddenly bombarded with more than 100 coots. All survived the landing, but they couldn't get airborne again because there wasn't enough room for them to get their customary running start. My co-workers and I caught them, tossed them high into the darkness and never saw them again."

John added (forgive me) a footnote. "I used to work closely with fisheries biologist Jimmy Davis from Elizabethtown. I once told him I had also seen it rain fish, but he told me that was impossible. I knew he was wrong, but you can't tell those biologists anything."

I am pleased to pass along to the faithful readers of this magazine these new discoveries in the field of wildlife biology. I can also report that one study currently in progress is designed to reveal why a real duck does not immediately fly away when it discovers that the duck sitting next to it is a plastic fake. It is hoped a secondary objective will determine why humans seeking companionship in a bar display the same lack of judgment.

"In every walk with nature one receives far more than he seeks."

–John Muir

JUAN PONS

OUTDOOR MOMENT

IN THE FEBRUARY ISSUE

NCWRC

WILDLIFE AND THE WARMING TREND

Trout, songbirds and timber are among the state's resources that could change as the atmosphere warms around the globe.

RECONSIDER THIS FISH

Before you throw that bullhead back, consult this guide to under-utilized fish species.

PIGS IN THE WOODS

A plague of feral pigs is threatening farmers' fields and wildlife habitat in the Piedmont and Coastal Plain regions.

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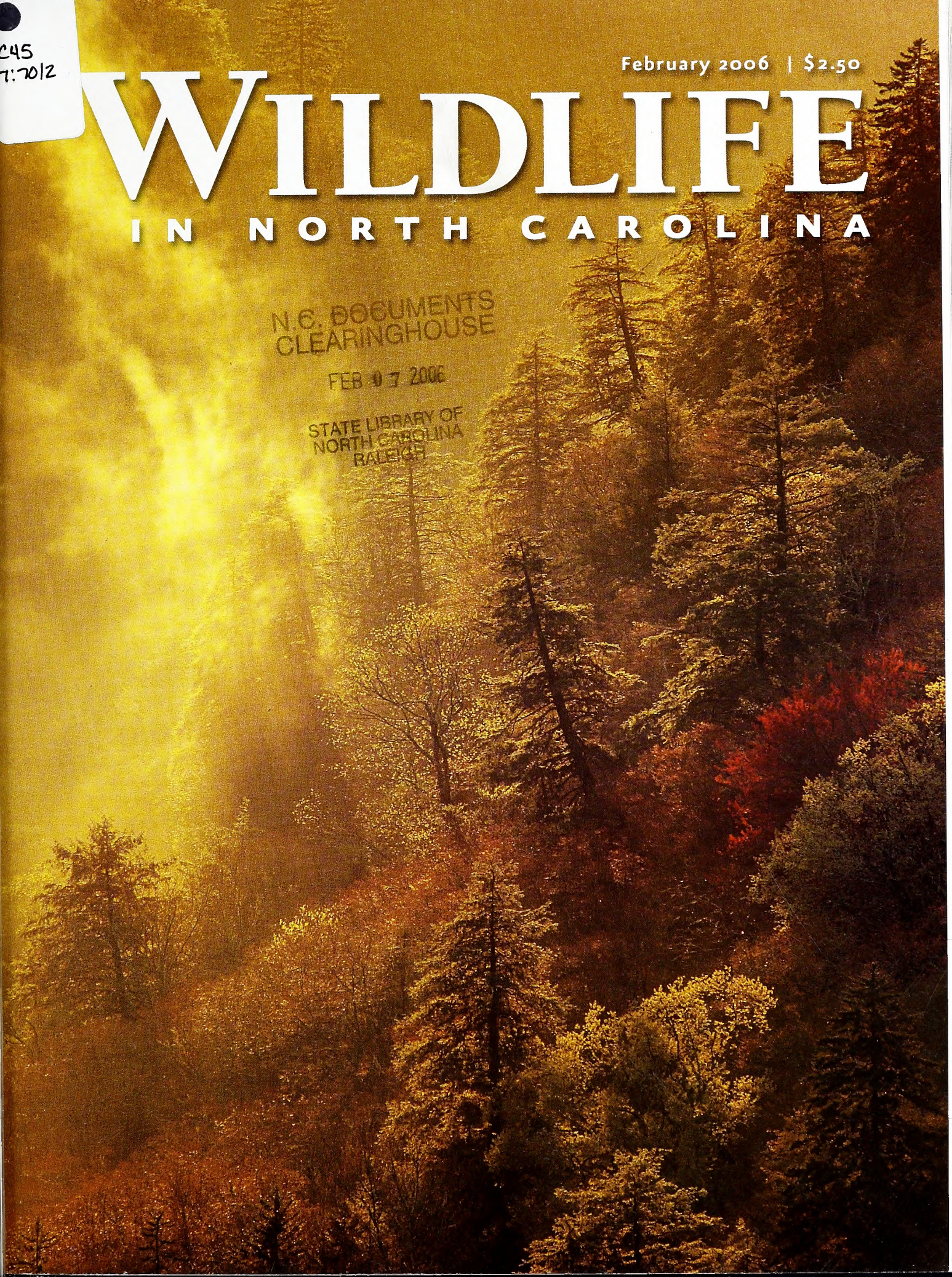

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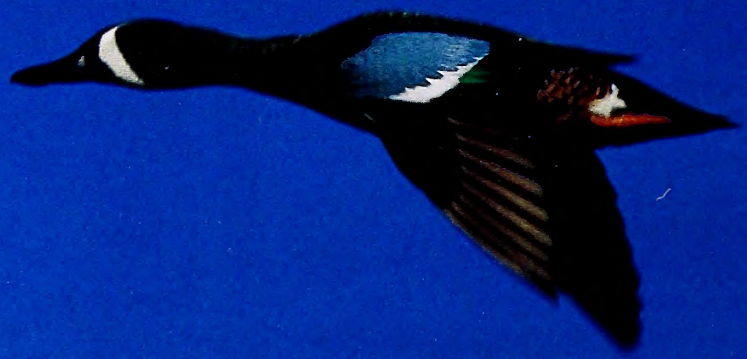
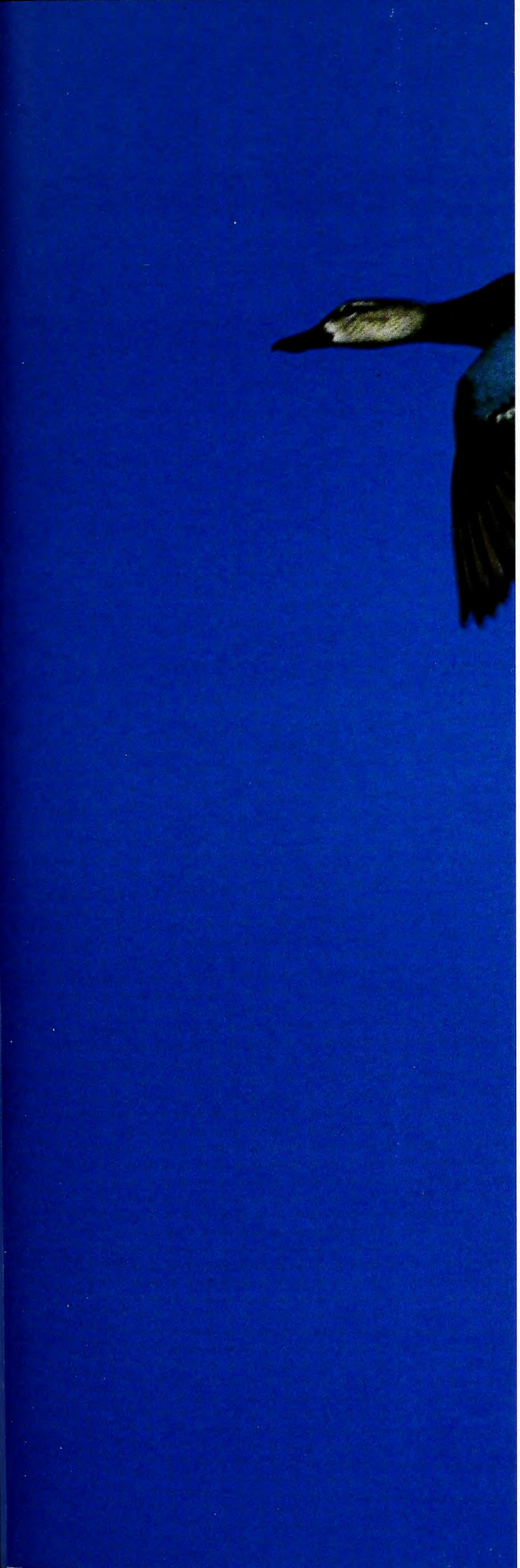


Blue-winged teal fly north to their summer breeding grounds this month. As the climate changes with global warming, they may be spending the winter farther north.
PHOTOGRAPH BY F. EUGENE HESTER.



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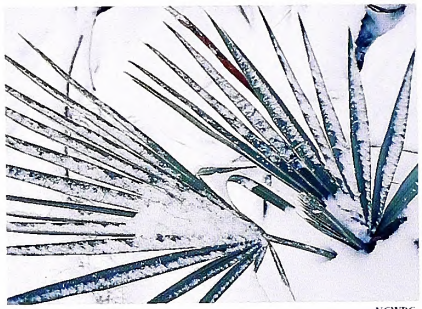
Cover: Red spruce forests reach their southern boundary in the high ranges of the Southern Appalachians. PHOTOGRAPH BY BILL LEA.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Hard to believe, but ice from the Antarctic has something to tell us about the red spruce on our cover and the snow-covered palmetto below. Both plants are at the edge of their ranges here in North Carolina. The palmetto is a subtropical plant whose northern limit is North Carolina's Coastal Plain; the red spruce is a North Country tree that extends southward on the highest slopes of the Southern Appalachians. North Carolina claims more than a few plants and animals near the edge of their ranges because of its unique geographical location and diversity of habitats.



NCWRC

In November, the journal *Science* reported on a nearly 2-mile-long cylinder of ice that researchers extracted from the Antarctic ice sheet. Some of the air bubbles trapped in this ice core are 650,000 years old. Scientists compared the air from ancient atmospheres with the air we breathe, and found that greenhouse gases are at much higher concentrations now than at any period in the long life of the core. Climatologists are studying how the accumulation of greenhouse gases will change global climate in the next hundred years or so. The consensus so far is that temperatures will be warmer, sea levels will rise, and some species will adapt to the changing environment by edging into more suitable territory, if they can. For example, North Carolina could become too warm for the red spruce, while the palmetto could expand its range in the state.

We asked John Manuel to find out what wildlife biologists and others have discovered about the possible effects of climate change on North Carolina's wildlife and natural resources ("Wildlife and Global Warming"). Biologists are at work on how the loss of key species could alter our landscape, and some researchers believe global warming is a factor in changes that have already occurred in our state.

At the urging of organizations such as the N.C. Wildlife Federation, the 2005 General Assembly established a study commission to suggest actions that the state should undertake to prepare for a world altered by global warming. The commission will issue its report this fall. Continued research on wildlife and natural resources ought to be high on the list of concerns.

Margaret Martin

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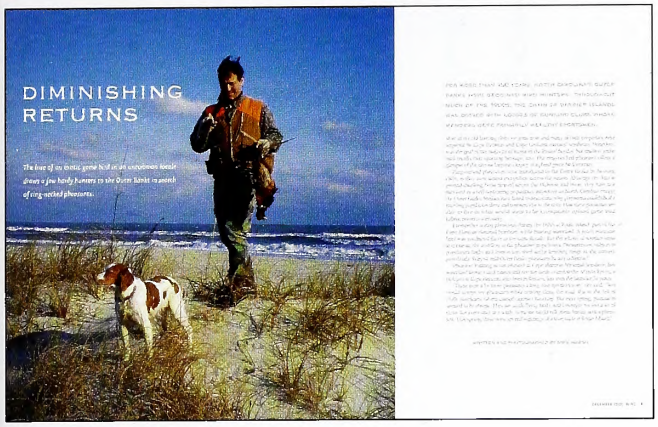


A December Gift

I am compelled to write a line or two after reading (cover to cover, I might add) the December 2005 issue. In one word, terrific! In particular, "Diminishing Returns" held me spellbound. Mike Marsh outdid himself this time. And the story on coyotes ("Bad Rep for Coyotes") was indeed factual, interesting and enlightening.

Lastly, Jim Dean did it again with his story "Bob and Mary" in Our Natural Heritage. I had the extremely good fortune of meeting Bob years and years ago over breakfast in Morehead, and I was taken aback by his dedication, foresight and keen interest in our wildlife. I also lost my soulmate some four and half years ago, and she, too, was my driving force. I, like Bob, try to stay busy volunteering and by getting back to nature. In any event, this was your best issue in some time, and I continue to look forward to each issue.

Gerald W. McLain
Raleigh

Hawk Happy

It is with great pleasure that I read the story by Jamie Cameron, "Drama in a Briar Patch," in the December issue. As a person with a long-term interest in falconry that spans over 30 years, and as a licensed and practicing falconer for more than 20, I can honestly say that I have never read a story that better captures the feel of a day in the field with a hawk. Most articles that have been written in outdoors magazines about falconry over the years talk about the how and the what, but Cameron captures the why for me. The approach to seeing the perspectives of all of the creatures involved — man, hawk and rabbit — well sums up my personal fascination with the immersion in nature that falconry is.

I guess the only thing that I would add is that it can be equally as exciting, if not more so, when a rabbit or squirrel outsmarts the hawk and gets away. I have subscribed to *WINC* for about the same amount of time that I have been into falconry and will continue both till I can't anymore.

Bob Pendergrass
Gold Hill

Many Pheasant Returns

I read Mike Marsh's article on the ring-necked pheasant ("Diminishing Returns") with interest. He described how the population had diminished in most of the areas of North Carolina except the Outer Banks. I was raised in north Louisiana, where a neighbor who owned over a thousand acres introduced ring-necked pheasants and several other non-native birds. The ring-necked pheasant survived well as an adult, but nesting in the wild was unsuccessful. I asked him why the birds were not able to reproduce, and his explanation was that the young chicks were killed by redbugs (chiggers). The redbug is common in hot, moist areas of the South during the spring and summer. However, if temperatures drop below 60 degrees, they perish. Also, our treatment for these pests was to bathe in salty water, as redbugs are very intolerant of salt. Perhaps the salty environment of the Outer Banks inhibits these parasites and the pheasants are able to nest and successfully reproduce.

Wayne Abercrombie
Mooresville

Go, Cat, Go

I am a fishing guide covering the Catawba River chain of lakes. I want to give everyone at the magazine a huge "thumbs up" on the great catfish article in the November 2005 issue written by Dan Kibler ("Crazy About Big Catfish"). The interest I have seen in catfishing is growing by leaps and bounds. Ten years ago, catfishing comprised maybe 10 percent of what I did on an annual basis, and now it comprises around 35 percent. My clients enjoy catching big catfish. With the introduction of blues and flatheads to Lake Norman, the dream of a catfishery rivaling famed Santee Cooper isn't out of the question.

Most anglers will never land a fish above 10 pounds. Targeting blues and flatheads that regularly exceed 30 to 50 pounds provides the average angler a shot at catching the biggest fish of his or her lifetime.

Stanley Correll Jr.
Catawba Lakes Guide Service
Nebo

Passport to Memories

I grew up with *Wildlife in North Carolina* magazine. My father was an old country boy from between Stokes and Pactolus who grew up hunting and fishing. Born in 1916, Dad did not hunt for sport — the family needed food on the table. Dad was 15 or 16 during the height of the Great Depression. He told me that his father would give him five .22 cartridges and the expectation was five kills for the table.

This need for groceries developed my father and many like him into excellent anglers and hunters. It also developed their passion for the outdoors. My father was disabled during his service with the U.S. Navy, and that limited his ability to get into the wild.

My mother kept *Wildlife in North Carolina* coming as long as my father lived. He loved the great photography and articles. I think it helped him feel the emotions of being on a creek at sunup or still-hunting as the sun sets. I recently rediscovered your magazine and have enjoyed every issue that I received.

Kevin Nelson
Winterville

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to* Letters, Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

ROAD to NOWHERE

AFTER 60 YEARS,
decision time nears for Fontana's North Shore Road and a vast tract of mountain wilderness.

John Brooks, an angler from Waynesville, learned to cast a fly rod on Noland Creek in the Great Smoky Mountains National Park 22 years ago. He still visits the stream a half dozen times a year, and prefers to hike upriver to cast in sections seldom visited by other fishermen. Evading throngs of anglers requires a lengthy walk, because the parking area at Noland Creek trailhead—9 miles west of Bryson City—is often brimming with cars along paved Lake View Road.

Farther west, less than a mile past Noland Creek, the road ends abruptly at four pillars that forbid passage by automobile through an arched 300-foot-long tunnel decorated top to bottom with decades of graffiti. Because of its abrupt end, this byway is also known as the Road to Nowhere.

The tranquil beauty of Fontana Lake belies the controversy surrounding the North Shore Road.

written by JACK IGELMAN

BILL LEA

Swain County residents were promised a road to homesteads made inaccessible by the completion of Fontana Dam in 1944 (far right).

Brooks hopes to continue calling the road just that. But many people in Swain County itch for a new name: the North Shore Road. They may get their wish if the once-promised road is completed from the tunnel to Fontana Dam.

Beyond the tunnel lie more than 250,000 acres of Great Smoky Mountains National Park, land that is accessible only by boat or foot. Brooks appreciates the leisurely approach to Noland Creek, but he has concerns about a road in the unfragmented wilderness beyond. He anticipates that a new thruway will increase traffic to remote fishing streams such as Hazel and Forney creeks. "While I like the access, it's not the experience I want all the time," Brooks explains. "I like to fish where I don't encounter many people."

Many fishermen echo Brooks' sentiments, yet the incomplete road has been a divisive issue in Swain County since construction was halted in the 1960s. With few places remaining as remote as the north shore of Fontana Lake, fishermen, environmentalists and others who appreciate solitude are troubled by the road's possible impact. "You have to look hard to find better fishing streams on the East Coast," says Brooks. "The road will change that."

More than 30 years ago, the streams of the north shore of Fontana Lake were spared the bulldozers. Will they be protected once again in this century?

Road, cash or compromise?

Fontana Lake was created in 1944 with the completion of Fontana Dam — at 480 feet, the highest dam east of the Mississippi. The elongated lake snakes through a narrow corridor of the Little Tennessee River watershed for 29 miles. Its placid current, slender width and frequent bends conceal its length and scope, creating the illusion of a smaller, less significant body of water.

Calm as it appears, the ripple effect of the lake's contentious beginning has churned a tidal wave that could reach a crescendo later this year when the National Park Service completes a two-year environmental impact statement and decides the fate of the largest unpaved area east of the Mississippi. The proposed North Shore Road would bisect some of western North Carolina's finest fishing streams.

With FEW PLACES REMAINING *as* REMOTE *as the* NORTH SHORE *of* FONTANA LAKE, FISHERMEN, ENVIRONMENTALISTS *and* OTHERS WHO APPRECIATE SOLITUDE *are* TROUBLED *by the* ROAD'S POSSIBLE IMPACT.

To satisfy a 1943 agreement with Swain County, the park must choose from a handful of options: a cash settlement of $52 million requested by the county; the building of a section of the road to Bushnell; construction of a 38-mile road to run the entire length of Fontana Lake within the park; construction of the Laurel Branch Picnic Area on the west end of existing Lake View Road; or no action. The Swain County commissioners have voted 4 to 1 to accept the cash settlement, the option also supported by Gov. Mike Easley.

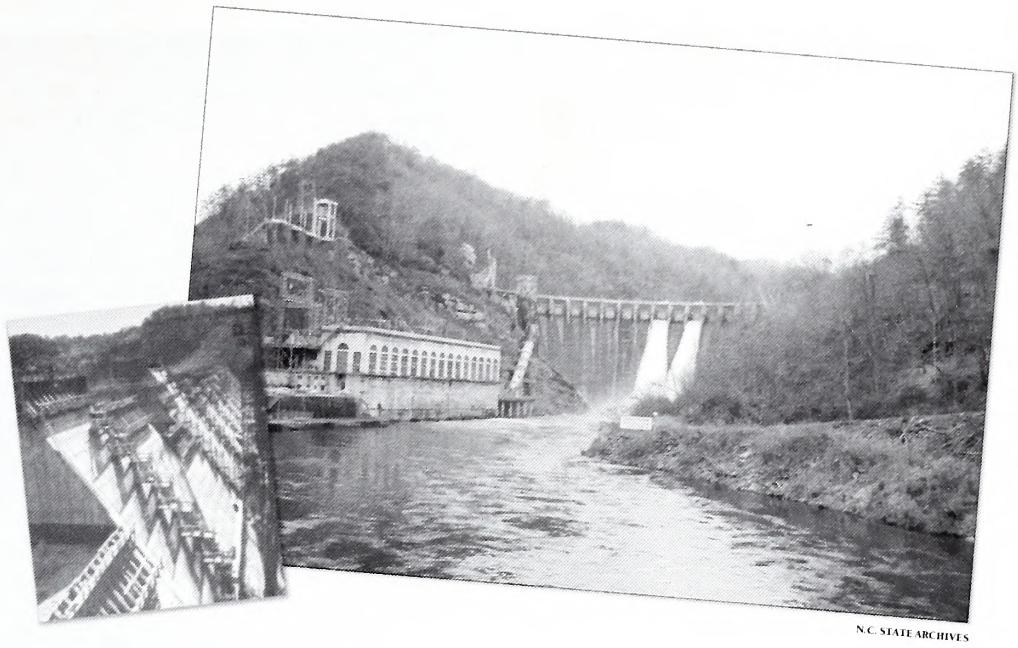
The North Shore Road is among the most debated projects in the park's history. In fact, throughout the history of the park, roads there have been built reluctantly. Some of the early promoters of the park opposed development of roads. "Many supported the park because the Park Service would build roads and because any roads were welcome in Appalachia in the 1920s and '30s," says park spokesman Bob Miller. "But later there were many who opposed road building."

In that era, the primary goal of conservationists was to safeguard the Smokies from logging interests. Threats from saws have diminished. The modern counterparts of the early park protectors are more concerned with bulldozers. Although the relative scarcity of roads within the park has preserved undeveloped space, the high-

RICHARD BERNABE

ways leading to the park have become more numerous, creating different problems. "We're the hub of this wheel. The spokes are getting bigger, but the hub isn't," says Miller, referring to a proposed four-lane highway heading straight to Atlanta—Interstate 3—and other projects in development. "There is always the potential to create new roads in the park."

Nowhere is Miller's assessment of road development more accurate than at the terminus of the Road to Nowhere. The bill that funded Fontana Dam, a project to provide power for Alcoa Aluminum's manufacturing facilities as part of the nation's buildup for World War II, was signed into law just days after the Japanese attack on Pearl Harbor. When completed, the dam's reservoir swallowed several Swain County communities and much of N.C. 288, which provided the only access to land along the northern shore of the lake.



N.C. STATE ARCHIVES

In 1943, Swain County, the state of North Carolina, the Tennessee Valley Authority (TVA) and the U.S. Department of the Interior signed a memorandum of agreement to build a new road along the north shore. Under the agreement, TVA would buy the land serviced by N.C. 288 on the north side of the lake, some 44,000 acres, and transfer it to the Department of the Interior for inclusion in the park.

Because the nation was at war, construction of the road was delayed until after the war ended. Between 1948 and 1972, the Park Service built a 7-mile portion of the road, but construction was halted because of environmental concerns.

Engineers discovered that the terrain for the proposed road was more unstable than they had anticipated, with a danger of landslides both during and after construction. Further work would require more invasive engineering than had been planned. Too, the road-builders found rocks of the Anakeesta Formation, a common outcropping in the Smokies. When disturbed, these dark, slaty rocks leach sulfuric acid.

The tie that binds

The cessation of work on the road was unpopular with Swain County residents. Some people want the road as a matter of principle. "It was promised to the people of Swain County who gave up everything they had—their homes and their lives," says David Monteith, a Swain County commissioner and road advocate.

But by the 1980s, the road movement had lost momentum. "At the time there was no expectation that the road would be built," says Miller. Two decades later, in 2000, a $16 million budget item to continue construction was introduced by district congressman Charles Taylor and Sen. Jesse Helms, prompting the environmental impact survey by the Park Service and giving road proponents new hope.

Road or no road, local ties to the land are as strong as ever. Just ask anyone who has family roots on the north shore. By the time 65-year-old Luke Hyde was born, his family had been relocated, although he can trace his lineage on the north shore for several generations and understands the substantial ties folks have to the area, particularly to its streams. Like Brooks, Hyde learned to fish on the north shore, but for different reasons.

HARRISON SHULL

The many creeks on the north shore of Fontana provide excellent trout fishing in remote stretches of the forest.

"THERE *is a* STRONG RELATIONSHIP BETWEEN PEOPLE *and* PLACE THAT GOES BACK *for* GENERATIONS."

"It wasn't recreational back then," says Hyde. "It was to provide food." Then, as now, water had multiple uses, serving as a source of fish, as irrigation for agriculture and to provide recreation. It also played a role in religion. Hyde's great-grandfather was a traveling Baptist minister, and baptisms in the clear streams were common. "People here believe water has purifying qualities," he says. "They regard it as sacred."

JACK IGELMAN

JACK IGELMAN

Some believe that building the road could help preserve mountain culture. Although remnants of abandoned communities have been swallowed by impenetrable foliage, more than 30 north shore cemeteries are still maintained and possess an uncanny vitality, a testimony to the mountaineers' unshakable connection to the past. "There is a strong relationship between people and place that goes back for generations," says Hyde, who favors a cash settlement to the county. "It explains the strong feeling people have over the road."

In 1963 the fish population in the upper section of Beech Flats Branch near the crest of the Great Smoky Mountains range was entirely wiped out. The fish kill was traced to the rerouting of Newfound Gap Road. Sulfuric acid generated by runoff during road construction slipped into the stream, lowered the pH level and killed the fish. "To this day, there are still no fish within a mile of the crest," says Miller. "And after heavy rains, there is still an increase in the acidity."

A decade later, the park halted efforts to complete the North Shore Road. It would be years, however, before the environmental hazard of the acidic soil was fully understood. At the time, construction was stopped primarily because of the high cost of stabilizing the slope's steep terrain.

These days the Park Service is quite aware of the potential environmental damage of road building in the Smokies. Types of rock vary significantly from place to place, but the chief concern is with Anakeesta, which contains iron sulfide. When water interacts with Anakeesta, it forms sulfuric acid, which kills fish and other creatures once it enters streams, as it did in Beech Flats Branch.

Though Anakeesta is thought to be common along the north shore of Lake Fontana, Keith Langdon, a park biologist, points out that the "Smokies are complex and deformed mountains—you discover rocks that you would never expect." In fact, because of its isolation, the area is the least-known section of the park. Because testing each square foot of the road path is impractical, the park treats all unknown rock as if it were hazardous.

Among the issues involved in the road-building decision are access to family cemeteries for nearby residents and the protection of wildlife on the north shore.

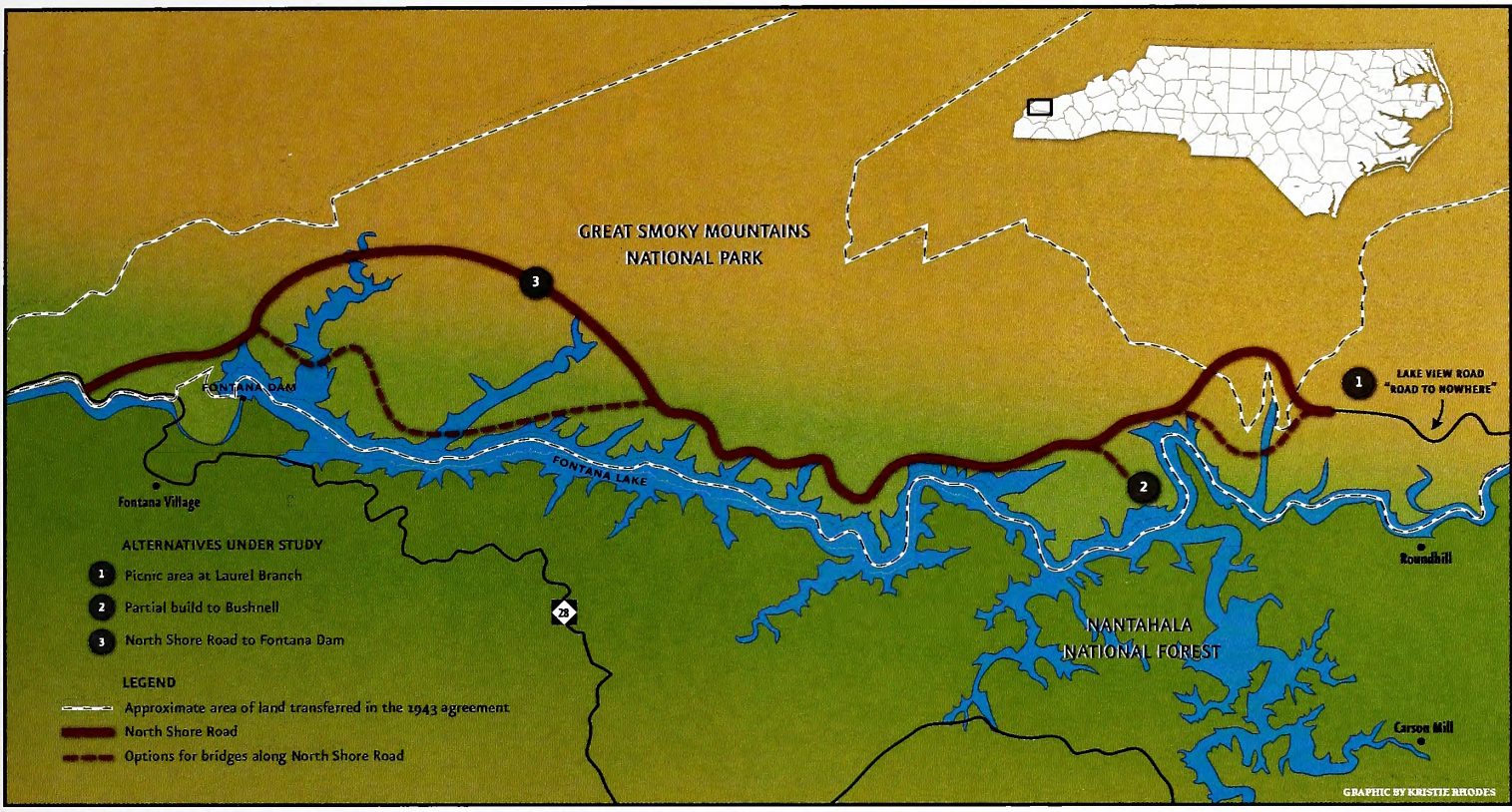
What it means for wildlife

Exposed soil, acidic or not, can affect fish populations if rainwater flushes it into streams. So earth-moving activity and fine-sediment pollution are the park's primary worries when it comes to the short-term impacts of construction. Creatures that serve as food for trout, such as mayflies, are particularly vulnerable to fine sediment. A decrease in the food supply would affect the density and diversity of the trout population.

"Streams are a function of what's happening in the watershed," says Powell Wheeler, a fisheries biologist with the N.C. Wildlife Resources Commission. Although techniques to control fine sediment have improved—installing silt fences, funneling runoff into temporary ponds, grassing exposed soils—Wheeler still has concerns. "Limestone neutralizes acid in stream water. However, limestone is not common in this corner of the state, and therefore these stream ecosystems are very sensitive to any amount of acid," Wheeler says.

If the road is built, fishermen such as Brooks hope it stays close to the lakeshore to moderate the effects of runoff downstream. This could be a tall order. Bald eagles typically nest near the shore, and a shoreline road will disturb their habitat. In addition, the road path must avoid archeological sites, of which there are many in the region. Fish and bald eagles are just two items on an expansive list of variables in the calculus of the North Shore Road decision.

JACK IGELMAN



Source: U.S. National Park Service

NORTH SHORE ROAD PROJECT OPTIONS

To keep that list in order, park managers have developed a matrix. "We try to write small," Miller jokes. "Meeting everyone's needs is not easy." To put it in broad view, on the wall of the common room in the park's Twin Creeks Research Center is a large board labeled "Status of Inventories of the Principal Natural Resource Group." According to the chart, there are 521 spider species and 88 fish species in the park, and next to the line "All Other Insect Orders" is "Thousands" in bold print. Not only are researchers adding to the list, but the park also tallies reports of new species that come in from recreational fishermen. Recently on Hazel Creek, a fisherman found evidence of abnormally large claws of a crayfish unknown in the park.

The staggering assortment of life may be a nightmare for arachnophobes, but it is a delight for admirers of the enormous biodiversity within the park. The park must juggle the disparate needs and interests of fishermen, former residents, nature watchers and wildlife.

TIM KNIGHT

Sixty-three years have passed since the 1943 memorandum of agreement to build the North Shore Road. Those with a stake in the outcome covet a finish to the unsettled wrangle over its future. There may be little common ground for road adversaries, but many agree that partial construction or "no action" is about as pleasing as a root canal.

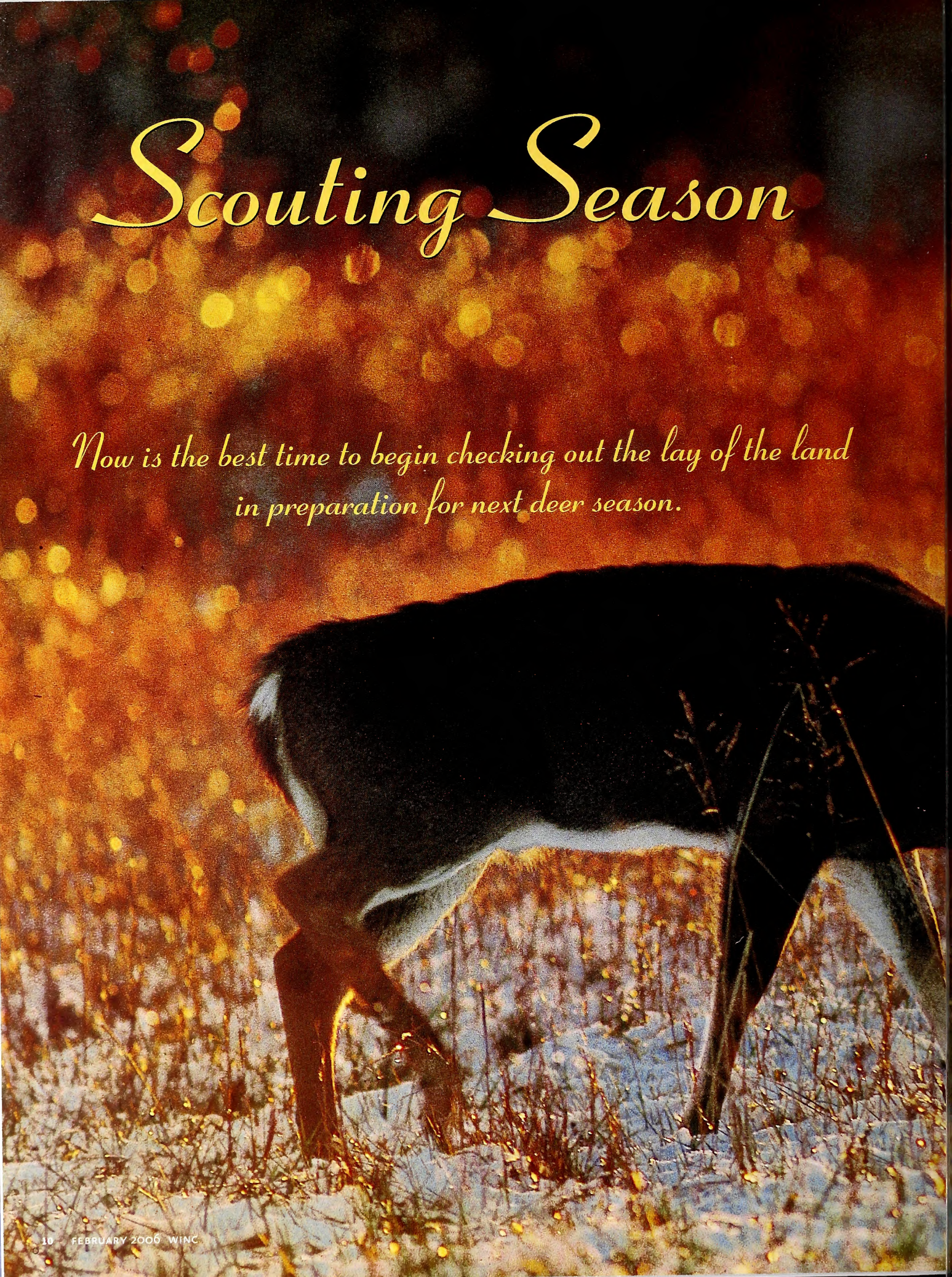
Yet even if the park recommends completing the road, its fate is still unclear. Highways aren't cheap, especially in the Smokies. "We are a tough place to do business," says Miller, referring to the added expense of construction due to the park's remoteness and difficult terrain. Recently, the cost of repaving Newfound Gap Road was $1.5 million per mile. It's not surprising that the North Shore Road cost is estimated at $375 million, a figure that could rise over time. Funds have yet to be budgeted, further complicating resolution of the issue.

Tremors from this debate may rumble for years, but there is hope that the park decision will cast at least a flicker of light on the future of the north shore's natural resources. As 77-year-old Claude Douthit of Bryson City puts it, "The time is now to decide." ◆

Jack Igelman is an Asheville writer.

Scouting Season

Now is the best time to begin checking out the lay of the land in preparation for next deer season.



BILL LEA

written by Gerald Almy

In times past, scouting was something most hunters did a month or two before deer season opened. We trudged out in late summer with foliage thick, the air hot and bugs swarming around us, biting and stinging. We really didn't learn much from those sweaty ordeals, but we were supposed to scout, and that was the time it was supposed to be done. Today's deer hunters have gotten smarter. Sportsmen in the know now do the bulk of their serious reconnaissance of woods, fields and travel patterns during the month or two immediately after deer hunting season closes.

Instead of shivering half-frozen and stationary in a tiny tree stand for hours, it's time to get moving. Grab your hiking boots and hit the woods. That block of cover just out of sight over the ridge that you were afraid to check for deer sign because you might chase a buck out of it onto the neighbor's property? Now is the time to scope it out. That honeysuckle and grapevine patch that seemed so enticing? Go see if there are tracks or beds around it now. Follow trails that you saw during the season but were afraid to walk for fear of disturbing the animals. Totally new areas that you'd like to try should be investigated now, too.

You still should be circumspect and quiet as you move through the cover, even in late winter and early spring. But you can go places you wouldn't have ventured earlier, because now it won't matter if you do spook a buck. If it's his core territory, which is what you're looking for, bumping into him there one time won't cause any big problems. He'll be back within a few hours or days—definitely in time for next year's hunting season.

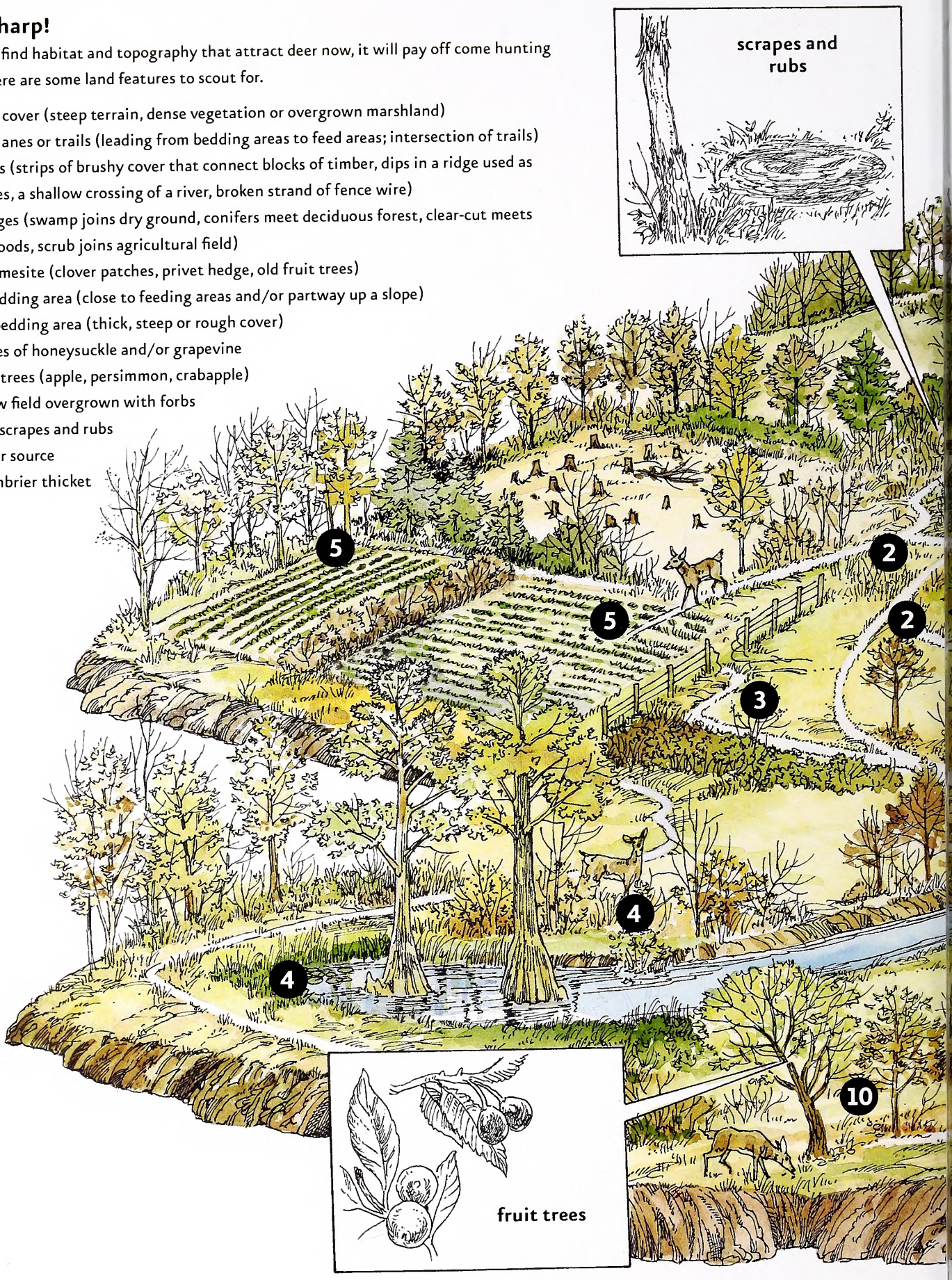
Of course, that's not the only advantage of postseason scouting. At no other time of year are the woods as open or sign as easy to see. This is the prime time to find deer bedding areas, travel lanes, feed areas and important topographic features that may influence where you place your stands. In late summer, all you have to do is make a quick final reconnaissance trip to make sure nothing has changed that would alter your hunting prospects, such as a field being taken out of crops or timber being actively logged. The less time you spend in summer and early fall in your prime deer area, the better. That's why you should get out now. Besides, postseason scouting offers a great way to unwind from the deer season while still keeping an active interest in your quarry.

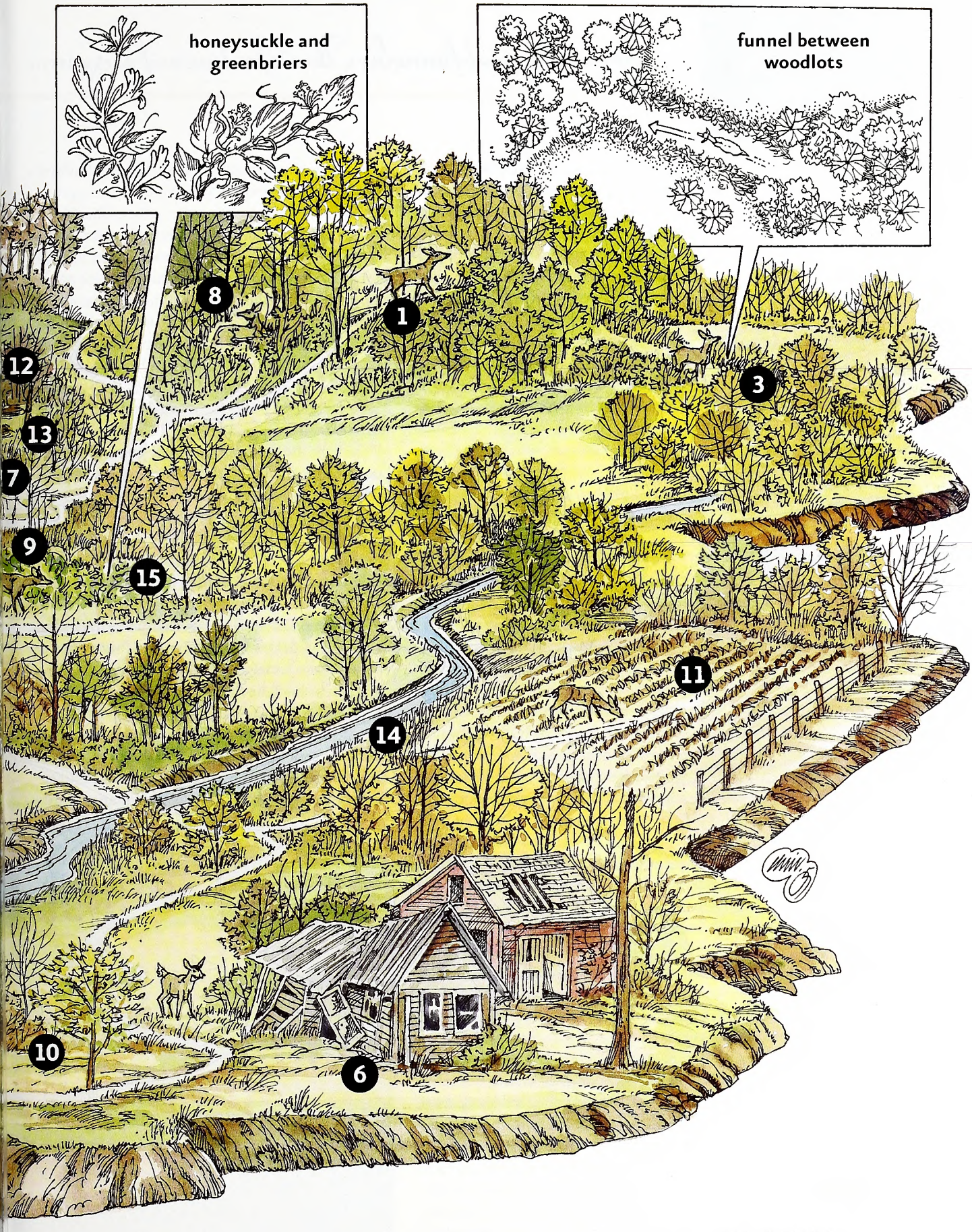
"At no other time of year are the woods as open or sign as easy to see."

Look Sharp!

If you can find habitat and topography that attract deer now, it will pay off come hunting season. Here are some land features to scout for.

1– escape cover (steep terrain, dense vegetation or overgrown marshland)
2– travel lanes or trails (leading from bedding areas to feed areas; intersection of trails)
3– funnels (strips of brushy cover that connect blocks of timber, dips in a ridge used as travel lanes, a shallow crossing of a river, broken strand of fence wire)
4 & 5– edges (swamp joins dry ground, conifers meet deciduous forest, clear-cut meets mature woods, scrub joins agricultural field)
6– old homesite (clover patches, privet hedge, old fruit trees)
7– doe bedding area (close to feeding areas and/or partway up a slope)
8– buck bedding area (thick, steep or rough cover)
9– patches of honeysuckle and/or grapevine
10– fruit trees (apple, persimmon, crabapple)
11– fallow field overgrown with forbs
12 & 13– scrapes and rubs
14– water source
15– greenbrier thicket





ILLUSTRATED BY CHRIS ARMSTRONG

GERALD ALMY

GERALD ALMY

Rubs and scrapes can be easy to see in the winter woods. Deer trails, scat and tracks are also fairly obvious during the time immediately following the season.

"Above all, find funnels. These features of terrain

With the woods open, important signposts such as rubs and scrapes are easy to find. Tracks and trails also stand out clearly. But you need to do more than simply look for a bunch of deer sign. Now is the time to analyze your hunting area carefully and learn about the habits and travel patterns of deer that live there. It's also a prime time to broaden your horizons and check out new areas that might be good alternative spots to hunt next fall.

Write notes about what you find, and mark on a topographic map or aerial photograph important discoveries such as major trails, bedding areas, heavily used water sources, rubs, scrapes and deer sightings. Often the significance of these findings won't be apparent right away, but as you look at them and study your notes, revelations will hit you. You may suddenly see a prime stand spot you never noticed before. You may discover that it would be better to move a pre-existing blind 100 yards over the next ridge where a funnel constricts deer movement through a narrow topographic corridor.

Always keep the big picture in mind as you scout. Some feed areas will be fairly obvious, such as a soybean, corn, wheat or alfalfa field. Big stands of mast-bearing oaks are also prime feeding spots, especially in early fall. Look for less obvious foods, also. Search for wild apple, persimmon or crabapple trees, grapevines, patches of honeysuckle, greenbrier thickets and fallow fields overgrown with forbs. All of these are areas that deer often browse while traveling from bedding to major feed areas.

Trails are worn down and easy to see in late winter. For a good stand site, look for trails leading from daytime resting spots to late-afternoon feed areas. Also, find places where two or more trails intersect. That's a prime blind site. Besides major trails, look for lighter, more thinly outlined paths in denser cover. These are often found 30 to 75 yards to the side of the main runways. That's often where larger bucks travel—near does and yearlings, but in heavier cover. If there are rubs or scrapes nearby, you've found a prime ambush spot.

Don't overlook escape cover, either. This is often located a half mile or more from the nearest vehicle access. It's typically in steep terrain, dense vegetation or an overgrown marshy area. Pinpoint on the topographic map the location of major parking areas or wide pull-off spots along the road, then look for the routes bucks will likely take to reach their escape sanctuaries when hunting pressure is heaviest.

Another type of sign to look for is a rub. This is a spot an inch to 4 or 5 inches in diameter where a buck has rubbed a tree with his antlers and shredded off the bark. Bucks don't necessarily revisit rub sites, but a line of rubs can indicate a travel route a buck took or a place where he hung out with a doe during the rut. Both are excellent stand sites.

Also look for scrapes—cleared oval areas on the ground where a buck pawed away the leaves. Try to find ones with a small branch 4 to 5 feet overhead that the deer chewed and marked with scent from its forehead and saliva. These are signposts bucks leave to give other deer information about themselves and to attract females as mating season approaches.

Look for buck bedding spots in thick, steep or rough cover. Does will bed in less-congested cover closer to feed areas—partway up a slope, for instance, instead of near the ridgetop. Mark these on your map or aerial photograph and hunt along routes deer use to move from these daytime hangouts toward

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or vegetation are easier to pinpoint now than during summer, when foliage is thick."

afternoon feed areas. Don't hunt too close to the bedding area, though, or you may spook the deer out of the area.

Edges are also important to note as you scout. Look for areas where a swamp joins dry ground, a stand of conifers edges up against a deciduous forest, a clear-cut meets mature woods or a strip of brush and shrub growth joins an agricultural field. After you locate such an edge, look for fresh tracks or rubs to confirm that deer are using that area.

Above all, find funnels. These features of terrain or vegetation are easier to pinpoint now than during summer, when foliage is thick. A funnel is a place where deer movement is constricted through a narrow passage. Hunting in a spot like this increases your odds for success. You can discover some of these areas by studying topographic maps or aerial photographs. To spot most of them, you need to get out on foot and start hiking.

Examples of funnels include thin strips of brushy cover connecting large blocks of timber, saddles or dips in a ridge that are used by bucks traveling from one side to the other, points where several hollows join at a bench or shelf, a shallow crossing in an otherwise deep stretch of river, and uncut strips of timber joining clear-cut areas. Even a broken strand of wire on a fence can funnel deer movement by providing a lower, easier crossing point.

On postseason scouting excursions, always keep an eye out for old homesites. Older bucks in particular love to hang out around these. They go for the clover growing where the yard used to be, or perhaps some privet hedge, or an old fruit tree or two. All are prime food sources, and bucks also seem to like the structure these areas offer, somewhat like a bass hanging out by a fallen log or brush pile.

As you search for these bits of sign and important topographic and vegetation features, patterns will begin to emerge. You'll gradually begin to decipher the daily movement corridors of the deer, and the core home ranges they use in your hunting area will stand out. This knowledge will allow you to eliminate large areas from consideration as you decide where to focus your hunting activity.

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With these hard-won insights, deciding on prime stand locations becomes easy. You may need to hunt totally new areas, or shift a stand a couple hundred yards in one direction or another.

Don't settle on just one prime location, however. Your scouting efforts should reveal several potential stand or blind sites you can use. Then you can select the best spot for a given day based on wind direction, hunting pressure, stage of the rut and other factors. If the route to reach the potential stand sites you've chosen is particularly thick or noisy to walk through, now is a good time to clear a trail to reach the area. Also trim back branches that might block a shot.

Mark It On A Map

Aerial photos and topographic maps are available from a number of sources online, including the easy-to-use site www.mytopo.com. North Carolina topo maps are available from the N.C. Geological Survey Division of Land Resources sales office at (919) 715-9718.

Once you've done your postseason scouting, you really don't have to intrude on the quarry much during summer and early fall. Simply make one final reconnaissance check to make sure nothing has changed since you scouted in late winter, and make sure there's fresh sign in the area. Do this mainly during the midday hours so you won't spook the deer, and wear rubber boots to avoid leaving your scent behind.

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Erect portable stands at this time, too, unless you use permanent ones. If you do choose permanent stands, repair and refurbish them as necessary, and make sure they're safe and stable. Now you're ready to sit back, relax and wait for the opener. ◆

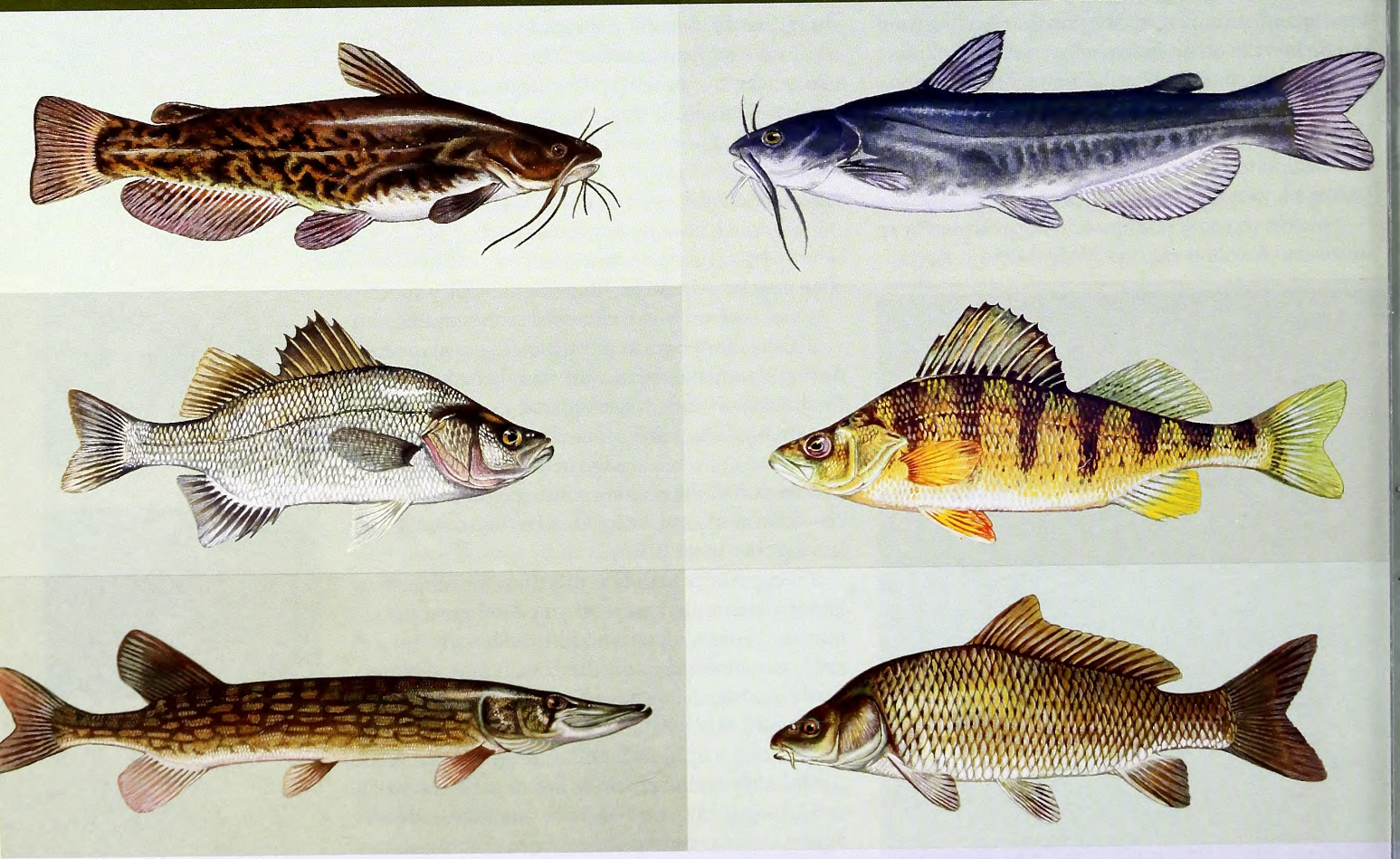
GERALD ALMY

Gerald Almy has been writing full-time about hunting and fishing for 33 years. He is a contributing editor to Field & Stream *and field editor for* Sports Afield.

LOVABLE LOSERS

These fish are among the species scorned and ignored by freshwater anglers, but when targeted, they can make for a tasty dinner or a fun day of fishing.

written by Dan Kibler | illustrated by Duane Raver



It's always another one that you're targeting when you hit the bull's-eye with them. You're never out there to catch them on purpose, but maybe you should think about it. What is it that makes them so neat to catch, but not neat enough to try for more often?

If fish could ask questions, maybe there is a species or two that would wonder those same things. Maybe they'd ask why they're treated like the ugly stepsister by all the boys in the boats, when they really do have wonderful personalities. "If they'd just get to know me . . ." Or something like that.

It's hard to believe that any fish currently swimming in North Carolina waters can really be considered underfished, but in fact, at least a handful are. Fishermen seem to enjoy catching them, most of the time, but they're rarely sought after. They're not the species that drive the tackle industry, not the ones that manufacturers have in mind when designing the latest rods, fishing line, baits and hooks.

Raise your hand if you've ever caught a white perch, chain pickerel, brown bullhead, yellow perch, white catfish or carp. I thought so, but aside from some carp-fishing contest at the pay-to-fish pond outside the city limits, have you ever gone out specifically to fish for any of them? "You can argue that there are some fish that nobody really sets out to fish for," said Scott Van Horn, a fisheries biologist with the N.C. Wildlife Resources Commission who first raised the issue of underfished species to me years ago.

Van Horn's assertion was based on the presence in different bodies of water around North Carolina of certain species that very few fishermen care about catching. Though they might run into these fish every once in a while, it's hardly ever on purpose—unless the fisherman is Van Horn, who's likely to spend an afternoon somewhere dunking a worm for a brown bullhead, baiting a bank with corn for carp or even sacrificing a pricey crankbait to a pickerel's toothy jaws.

Brown Bullheads/White Catfish

As the flathead catfish has expanded its range in the state, the number of places that hold a fishable population of bullheads has decreased. But that doesn't make the little catfish any less desirable. Bullheads are the smallest of the catfish, and the brown bullhead is the most common in our state's rivers, streams, ponds and small reservoirs.

"When I first came to the Wildlife Commission, we were sampling a city lake in Mebane. One day a guy came off the lake, and he had a 5-gallon bucket full of bullheads—with every bit as much meat on them as any crappie," Van Horn said. "You think about taking ultralight spinning gear and fishing on the bottom with a little worm; that's how he was getting those fish.

"When most people go catfishing, they're probably fishing for channel cats with cut bait or chicken livers or that kind of thing. Up in New England, people will fight over the chance to catch bullheads. And you can still catch 'em in places where there are no flatheads. The state used to be full of little bullheads, but as the bigger cats, especially flatheads, move in, bullheads will start to disappear."

Bullheads rarely reach 5 pounds, but they are considered excellent table fare, with firm, pink meat. The fish is native to most of the eastern United States and Canada.

White catfish are the smallest of the four major species of catfish (the others being blues, flatheads and channel cats), and they are common up and down the Atlantic coast. Van Horn said they're most commonly found in coastal rivers and streams. "They're smaller, and they fill a niche between channel cats and bullheads," he said. "When you talk about fishing the coast, rivers like the Cape Fear, you're thinking about channel cats, blues and flatheads, but there are an awful lot of rivers and streams and lakes with good populations of white catfish and bullheads."

White catfish are considered extremely tasty. Much less nocturnal than other catfish species, they have become very popular for stocking in private ponds and lakes.

White Perch/Yellow Perch

Rarely has there been a fish that is beloved at one end of the Tar Heel State and cussed regularly everywhere else. Welcome to the world of the white perch, which thrives in the tannin-stained waters of coastal streams and is prized there by fishermen. In reservoirs in the Piedmont, however, white perch are more often cursed for working over young-of-the-year crappie and stripers and showing up when you think you're about to load the boat with largemouth bass or stripers.

"When you run a creel survey on a lake, hardly anybody says they're fishing for white perch," Van Horn said. "In some places, if you're a crappie fisherman, you cuss white perch, because it's hard to keep your bait on and get it down through the white perch to the crappie on the bottom.

"But there are times and places when white perch can turn into a pretty desirable fish, especially in brackish coastal streams. People there thought so much of them that they scattered 'em around throughout the state—it certainly wasn't the Wildlife Commission doing it. Now they're ubiquitous."

White perch are not really perch. They're members of the bass family, a close relative to white bass and striped bass—but they are much more palatable than those species. In his book "McClane's New Standard Fishing Encyclopedia," the late A.J. McClane claimed, "There is no finer fish to eat than the white perch."

But few fishermen in the Piedmont have tasted them, in part because the fish tend to become overpopulated and somewhat stunted. When they do thrive in a reservoir and start to reach reasonable eating size—around a half pound or more—they're a taste treat. So if you find them, take advantage of the situation.

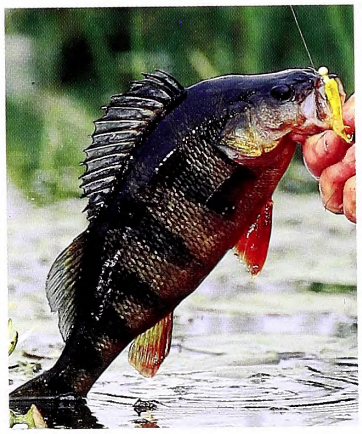
"In general, they're not a good thing to have in a reservoir, but when they're doing well, they're a fish well worth trying to do something with," Van Horn said. "Depending on where you are, white perch can go through periods when they really thrive. At Kerr Lake five or six years ago, white perch tended to be a little on the small side. Then all of a sudden, guys who were big-time striper fishermen were putting kids in their boat and sitting over a couple of acres of white perch, from a pound to a pound and three-quarters.

"Sometimes, like crappie, they really pull off a great year class. They can be pretty nice fish for a handful of years, then small, ornery fish for a handful of years. When they're good, they're an exploitable resource, but in reservoirs, most of the time you see way too many fish. But if you get a couple of bad reproductive years—or a couple of good years for baitfish—then something very ordinary becomes extraordinary. But if they're not on your radar screen, you can miss your chance."

F. EUGENE HESTER

Counterclockwise from top: Brown bullhead catfish are more popular in the Northeast than down South. White perch can be found all over the state but are native to blackwater streams. A good day fishing a Piedmont reservoir could result in catching several of the species mentioned in this story. Carp are fun to catch, but not as enjoyable to eat. Chain pickerel smash bass lures with their prominent, toothy jaws. Yellow perch are tough to find in lakes but can be caught in coastal rivers.

F. EUGENE HESTER



F. EUGENE HESTER

KEN MARTIN

KEN MARTIN

F. EUGENE HESTER

In recent years, fishermen at Lake Norman have started to run into nice white perch that push a pound in size. Ditto at Lake Wylie, except that the fish haven't reached the same size class yet. At High Rock Lake and Falls Lake, however, they're still small enough to be more of a pest than a positive.

Schooling in deep water, they're just as apt to feed heavily during the hottest summer months as in the spring and fall. They'll hit a live bait, a jigging spoon or even a crankbait that's better than half their size.

"I can't wait," said guide Chris Nichols of Belmont, "to get out here in the summer over one of these humps with a little jigging spoon and just load the boat with 'em. Plus, they make great bait for blue catfish."

Yellow perch, also known as coon-tails or raccoon perch, are a very tasty cousin of the walleye. Crappie or bream fishermen often catch them, but not in large enough numbers to warrant much attention. "They've gotten awfully hard to catch in most of your Piedmont reservoirs," Van Horn said. "On the coast you catch some in blackwater ponds, streams and rivers — the size I used to catch in Lake Erie when I was growing up. But this is really the southern edge of their range, so they don't thrive."

Give 'em a Try

SPECIES

Brown bullhead *(Ameiurus nebulosus)*

White catfish *(Ameiurus catus)*

White perch *(Morone americana)*

Yellow perch *(Perca flavescens)*

Chain pickerel *(Esox niger)*

Common carp *(Cyprinus carpio)*

Chain Pickerel

Look at that snout, that mouth. No wonder when people accidentally land a chain pickerel, they refer to it as a "toothy critter." Known as a "jackfish" across the South, the pickerel is an aggressive fish that often intercepts the lure cast by a bass fisherman for his favorite quarry. "By and large, bass fishermen view them as a nuisance," Van Horn said. "They can chew up a pretty expensive balsawood plug with those teeth."

Pickerel species belong to the pike family, although they are a great deal smaller than the muskellunge and Northern pike that live in the waters of the northern United States and Canada. Their long, torpedo-shaped bodies are yellowish to greenish with horizontal markings on the sides. Up north they're considered a delicacy — but one that you have to work hard to eat. Filled with a tremendous number of small bones, a pickerel is a difficult fish to clean and prepare for the skillet, but well worth it when floating in the hot grease.

Bud Haynes, a Clarksville, Va., guide who leads fishing parties on Kerr Lake, had a change of heart one day after catching a big jackfish on a bass-fishing trip. "I had this guy from Baltimore, and he caught one, and I was about to put it back when he told me how good it was to eat," Haynes said. "And it was. It was real firm, white meat, like a crappie, but you had to be real careful with the bones. I'd probably feed it to my grown son, but I don't know about children."

Van Horn said that pickerel are prevalent in blackwater streams, swamps and old millponds; they thrive in habitat with a lot of aquatic grass. "They're pretty common in Lake Mayo, in Gaston and Shearon Harris," he said. "If you make up your mind, you can go fish for 'em. They are relatively willing to bite when the weather is a little colder than when the rest of the fish will bite. They can be an off-season fish; up north, they catch 'em through the ice."

Van Horn said that chain pickerel "add a little spice" to the fishing in a lot of streams in the Coastal Plain and the Piedmont, including the Deep, Eno, Flat and Tar rivers. "I used to take trips to the Sandhills and fish the Gum Swamp on the game lands," he said. "I'd go in February and catch 2- and 3-pound chain pickerel on light tackle all the time."

Carp

Yeah, we know, everybody in Europe loves carp. They're the largemouth bass of the old country. But the fact of the matter is, carp can be a really challenging fish on light tackle, even if you never dredge them through cracker crumbs and drop them in a skillet.

They're just about everywhere, from streams to ponds and big reservoirs, all across the state. And they are fairly easy to attract: Just dump some corn, other grain or meal into a pond or lake along a certain bank and come back later. The carp will be waiting when you return.

Van Horn, whose office is near Falls Lake north of Durham, said he treats his coworkers to a light-tackle outing every year. "In the spring I'll take a 50-pound bag of corn into the back of a creek and dump it out and pull all the carp in there," he said. "I'll break out a 7-foot ultralight rod with 6-pound test, a tiny hook baited with corn, and catch fish from 2 to 7 pounds.

"I don't let too many years go by without doing that a time or two. It's fun. You're concentrating them with the corn. Last year some of the guys who work for me, after work, I took them to a spot I had all baited up. These are guys who have bass boats in their driveways, and they got pretty excited, catching nice fish and breaking them off on that light tackle.

"If you ask anybody who has done it, they'll tell you they're fun to catch, and they pull hard. But I don't eat 'em."

Dan Kibler is the outdoors editor of the Winston-Salem Journal.

	WHERE TO CATCH	OFTEN CAUGHT WHEN FISHING FOR . . .	GOOD TO EAT?
	ponds, small lakes, rivers, streams	Channel catfish, crappie	Excellent
	coastal rivers and streams	Channel, blue & flathead catfish	Extremely tasty
	blackwater streams, reservoirs	Crappie, striped bass, largemouth bass	Nothing finer
	coastal ponds and streams	Crappie, bream	Very tasty
	blackwater streams, swamps, millponds	Largemouth bass	Bony but good
	everywhere	Bass, crappie, bream	An acquired taste

wildlife & GLOBAL WARMING

written and photographed by john manuel

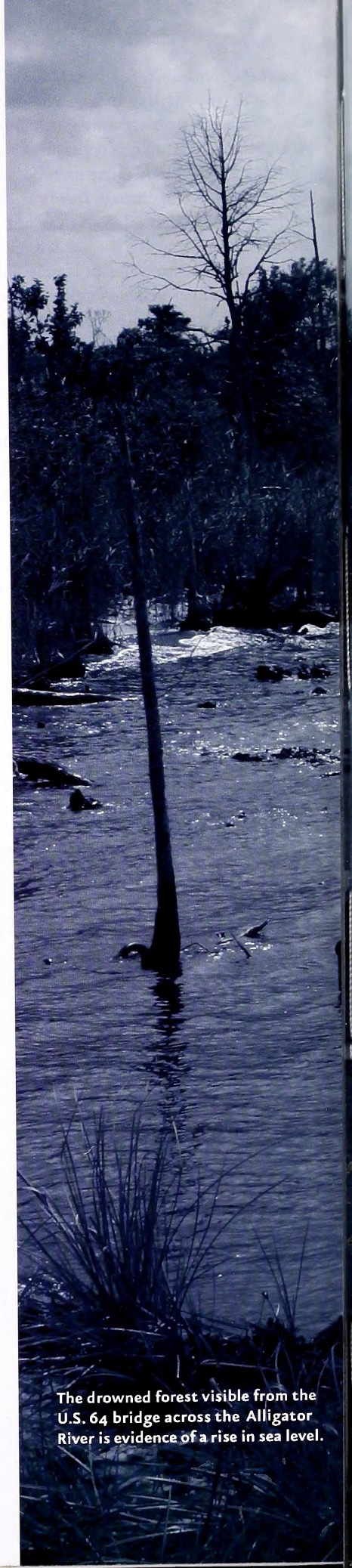
JUST NORTH OF MANNS HARBOR ON NORTH CAROLINA'S CROATAN SOUND, BEN POULTER WADES AMONG THE SKELETAL REMAINS OF A ONCE-FLOURISHING POCOSIN FOREST. WILDFIRE KILLED THE TREES A FEW YEARS BACK, BUT WHAT CONCERNS THE DUKE UNIVERSITY RESEARCHER IS THE FACT THAT NO TREE SEEDLINGS ARE COMING UP.

Instead, a thick mat of chest-high sawgrass has invaded the forest. Sawgrass thrives in regularly flooded ground and is more tolerant of salt than such species as pond pine and cedar. The forest, it seems, is in retreat. Aerial photographs dating to the 1930s confirm that trend, at Croatan Sound and elsewhere along the coast. Though fire, disease and other factors may contribute to the retreat, Poulter believes that the chief driver is sea level rise, a byproduct of global warming.

NORTH CAROLINA HAS STARTED PLANNING FOR A SHIFT IN CLIMATE. WHAT COULD GLOBAL WARMING MEAN FOR THE STATE'S WILDLIFE?

Global climate is always changing, and sea levels change as well. Nearly 2 million years ago, at the dawn of the Pleistocene Epoch, sea levels began to fall dramatically as growing glaciers locked up increasing amounts of the planet's water. At its lowest level during the Pleistocene, the North Carolina coastline was 20 to 50 miles *east* of today's beaches. Sea levels rose during the interglacial periods, with the ocean covering the entire Coastal Plain as far west as modern-day Roanoke Rapids and Lillington.

Today, glaciers are melting, and sea levels are rising again as the warmer ocean water expands. This time the increase in temperature is relatively sudden and is believed by many scientists to be driven by the release of greenhouse gases into the atmosphere—in direct relation to the industrial-age increase in combustion of fossil fuels.



The drowned forest visible from the U.S. 64 bridge across the Alligator River is evidence of a rise in sea level.

Left: Ben Poulter explains how spartina grass (foreground) and sawgrass (background) are overtaking a pocosin forest as sea level rises. The marsh grasses favor wet ground and are more salt-tolerant than pond pines or cedar trees. Far right: Jeff DeBlieu, director of The Nature Conservancy's Nags Head Woods Preserve, joins Poulter on a survey of places where changes in plant succession may be a sign of climate change.

Scientists agree that the planet is warming. Arctic ice is melting at an increasing rate, and NASA satellites indicate sea level is rising about 2 to 3 millimeters per year. Using a combination of ice cores, lake sediment cores and tree rings, scientists have gathered information on Earth's climate back to A.D. 1000. Their findings show that temperatures started a dramatic rise in the late 1800s. The decade of the 1990s was the warmest in the past millennium for the northern hemisphere.

How will North Carolina's climate change in the next century, and how will wildlife adapt to the change? The National Center for Atmospheric Research predicts that mean temperatures in the southeastern United States will increase 3 to 9 degrees Fahrenheit by 2100. The center's models predict substantial increases (25 to 35 percent) in precipitation in the spring and substantial decreases (20 to 30 percent) in the summer. Changes in fall and winter precipitation will be relatively small. Across the Coastal Plain, Piedmont and Mountain regions, wildlife would encounter higher temperatures and markedly drier summers.

PLANTS

Peter White, director of the N.C. Botanical Garden, points out that North Carolina is the northern limit for trees such as the cabbage palm and the southern limit for trees such as the red spruce. "I've heard experts say the climate of North Carolina would be like that of southern Georgia," White says. "If so, we might see a significant turnover in tree species."

The one place to look for dramatic impacts would be mountain forests, White says. "Over the millennia, as climate has warmed and cooled, these forests have migrated up and down the sides of our mountains. Now they are backed up to the highest elevations. If subjected to increasing temperatures over a long period, they may be shoved off the mountains altogether."

White believes that localized extinction has happened in the past. While researching rare plants in the high mountains, White noticed that a number of plant species, such as small mountain bittercress and mountain avens, were absent in the lower-elevation mountains, even though the species are certainly capable of surviving there under present climate conditions. White believes such plants lived on these lower mountains at one time but were unable to retreat high enough to escape the heat during past warming trends and became locally extinct. Now, White says, the high mountain ecosystems are threatened by rapid climate change. Cool and moist climates that occur on north-facing slopes in the Piedmont might also become a thing of the past.

> "I've heard experts say the climate of North Carolina would be like that of southern Georgia. If so, we might see a significant turnover in tree species."

The U. S. Forest Service has predicted the potential for redistribution due to climate change of 80 tree species. Sugar maple, which now grows in our Piedmont and Mountains, could be absent south of New York state, except in a small region of West Virginia. Longleaf pine, on the other hand, could expand from the southern Coastal Plain all the way to the foothills.

ANIMALS

As with plants, North Carolina represents the northern range limit of some animal species and the southern range limit of others. Species from the south would logically be expected to extend their range northward, and those that are at their southern limit would retreat, as the climate warms.

"Historically, species have moved north and south, and up and down in elevation—the so-called ice age yo-yo effect," says Jesse Perry, director of public programs with the N.C. Museum of Natural Sciences. "The problem now is that the landscape is more fragmented, and that can interfere with migration. Plants and animals may hit a wall and go extinct."

Species at their northern limit include the chicken turtle, the American alligator, the diamondback rattlesnake and a variety of frogs. Museum biologist Alvin Braswell says at least one frog species is already spreading north and westward in North Carolina, though factors other than climate may be involved.

"We saw our first green treefrogs in Wake County in the 1980s," Braswell said. "[This species] has now been documented in Durham and Orange counties. Warmer temperatures may play a role, but I suspect

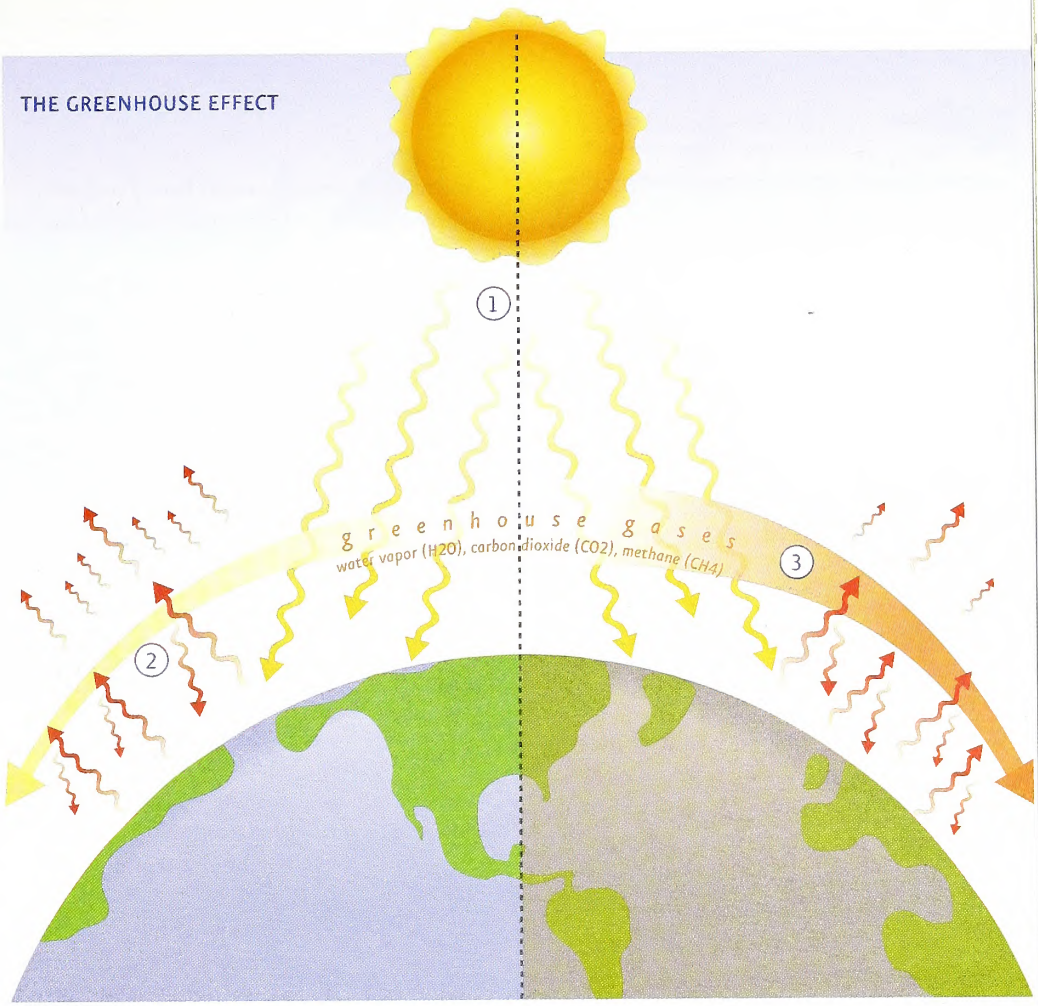
its range has expanded with the spread of hydrilla, which provides cover."

Alligators have recently colonized Merchants Millpond in Gates County and have been seen as far north as Chesapeake, Va. "I've been at Merchants Millpond for 25 years and had heard of only one or two alligators ever being found north of Albemarle Sound," said Floyd Williams, head ranger at Merchants Millpond State Park. "They've been here now for nine years."

Increased ocean temperatures could be luring a whole host of tropical fish to reefs along the North Carolina coast. The National Marine Fisheries Service has been counting and tagging fish in Onslow Bay since 1975. In the last decade, biologists recorded 29 new species of tropical fish on the reef and increased numbers of previously observed tropical fish. Meanwhile, no new temperate fish have been found, and some, such as the black sea bass, are markedly less abundant.

Species at their southern limit that could suffer from hotter and drier summers include a number of salamanders: Weller's salamander, Wehrle's salamander and the red-cheeked salamander. "If you crank up the temperature a few degrees, you could lose those species," Braswell said. "Some of these are already receiving pressure due to forest change."

Trout found in our mountain streams would also be harmed by hotter and drier summers. "Anything that leads to widespread



1) Sunlight warms Earth's surface. 2) Earth's surface radiates heat to the atmosphere. Some heat goes into space. Greenhouse gases absorb some heat and reradiate it toward Earth, making it warm enough for life to exist. 3) Higher concentrations of greenhouse gases send more heat back to Earth's surface. "The current concentration of carbon dioxide is higher than at any time during the past 420,000 years, and the increase can be directly linked to human activities."

—*National Wildlife Federation*, "The Waterfowler's Guide to Global Warming"

EVERYDAY ACTIONS CAN HELP CUT EMISSIONS THAT INCREASE GREENHOUSE GAS CONCENTRATIONS

Reduce, reuse, recycle. www.epa.gov

Keep tires inflated and engines tuned. www.fueleconomy.gov

Make your house and place of business more energy efficient. www.energystar.gov

Go car-free now and then. www.ncdot.org

Buy "green power" from your utility company. www.ncgp.org

Plant and care for native trees. www.ncbg.unc.edu

THE FOREST FACTOR

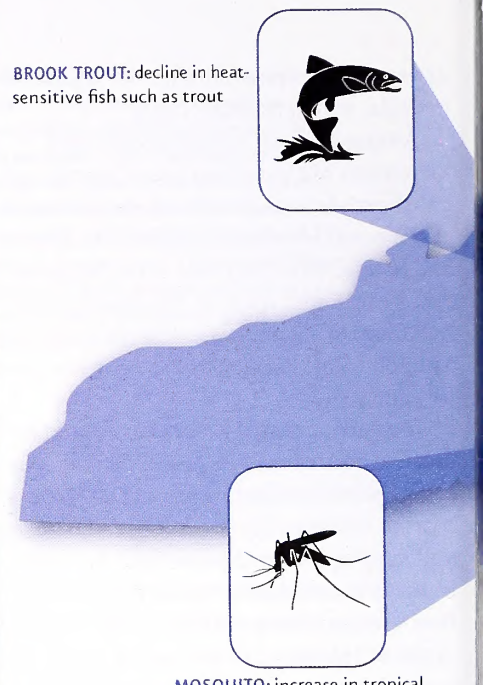
Could forests benefit from one aspect of global warming, namely increased carbon dioxide? Could forests and soils help reduce carbon dioxide buildup in the atmosphere by storing carbon? William Schlesinger, dean of the Nicholas School of the Environment at Duke University, says the answer to both questions is a qualified yes.

An experiment using Free-Air CO_2 Enrichment (FACE) technology has been in progress at Duke Forest for a decade. Towers fumigate plots of loblolly pines with carbon dioxide at concentrations designed to approximate Earth's atmosphere in the year 2050. The study has shown that increased carbon dioxide enhances the growth of trees, though it appears that the availability of nitrogen in the soil may reduce production over time.

In the first year, the fumigated trees produced 25 percent more wood than trees in control plots, though the margin has declined to around 16 percent in later years. More carbon was retained in soils and woody materials in the experimental plots than in control plots. But compared with the amount of carbon now entering the atmosphere, the effect is minimal. Schlesinger says forests and soils shouldn't be counted on to solve the global warming problem.

warming of streams would have a negative impact on the distribution of trout," said Mallory Martin, fisheries biologist for the N.C. Wildlife Resources Commission. Martin says extreme water temperatures (above 80 degrees Fahrenheit) are deadly to trout. Heat and drought in combination could kill fish throughout an entire watershed, as high-elevation streams dry up and lower-elevation streams become too warm.

Warmer temperatures could also lead to fewer ducks along North Carolina's coast. Waterfowl could stop farther north in winter to find ice-free water and suitable food. The National Wildlife Federation has made global warming a top priority, citing among other changes the northward shift that the U.S. Forest Service projects for the breeding range of mallard and blue-winged teal in the Atlantic Flyway. State officials with N.C. Ducks Unlimited have expressed concern about the effects of global warming.



OUTER BANKS WILDLIFE

The fate of the more than 400 bird, mammal and reptile species that frequent the Outer Banks is harder to predict. The banks are basically sand ridges that have been moving westward through the process of storm overwash. Artificial dunes and fences that protect shore roads and buildings actually narrow the islands as erosion eats away at both shorelines. The disappearing act could threaten habitat for species such as the piping plover, which nests in sand flats created by overwash, and the loggerhead turtle, which can't scale the steep oceanfront scarps to lay its eggs.

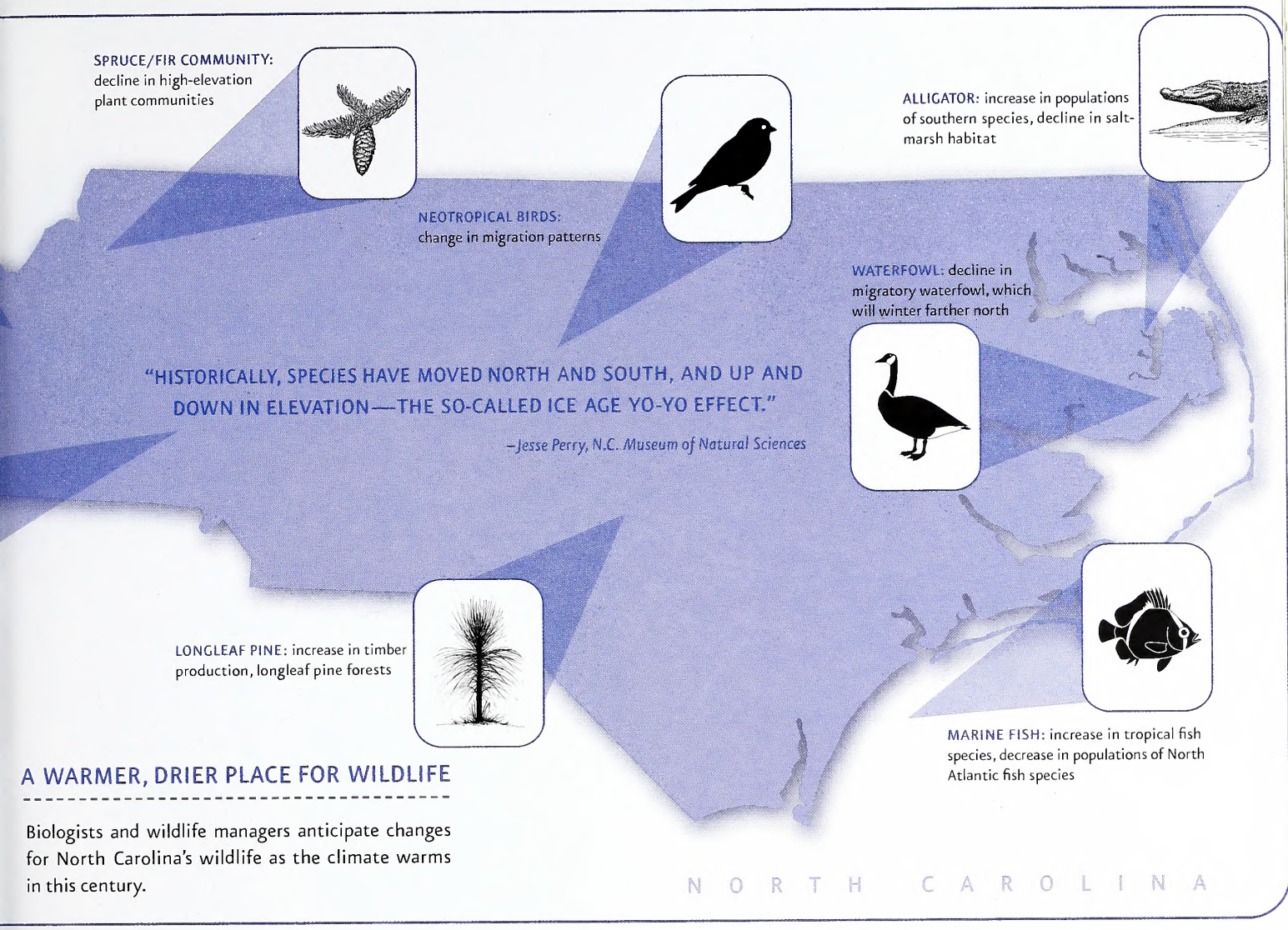
CHRIS HILDRETH/DUKE PHOTOGRAPHY

The same process applies to the marshes. Where shorelines are protected and gradients are shallow, marshes can migrate landward as sea levels rise. Sediment and plant materials build up on the back side of a marsh at the same time that wave action erodes the outer edge. But where gradients are steep, or where structures such as sea walls, buildings and roads prevent their movement, marshes will simply disappear when flooded by rising sea level.

Stan Riggs of East Carolina University has seen dramatic erosion—as much as 23 feet per year—on the shores of the Pamlico and Albemarle sounds and on the Outer Banks north of Cape Hatteras. "If the [foremost climate models] turn out to be true, North Carolina is in for serious consequences," Riggs says. "Within the next century, the Outer Banks could be reduced to a few scattered islands, and there would be major land losses in Currituck, Camden, Dare, Hyde, Tyrrell and Pamlico counties."

Today, Pamlico Sound's shallow, low-salinity waters and marshy edge provide a high-quality nursery habitat for finfish and shellfish. If salt water washes over the Outer Banks, Pamlico Sound would become a bay, with the corresponding loss in nursery habitat.

"If we lose Pamlico Sound, it would reduce our productivity tremendously," said Louis Daniel of the N.C. Division of Marine Fisheries. "We would see more coastal migratory pelagic fish—king



mackerel, false albacore and cobia—but adding that region to the oceanic habitat would be insignificant compared to the loss of estuarine habitat."

Can we minimize the negative effects of climate change on North Carolina wildlife? The U.S. Fish and Wildlife Service and The Nature Conservancy are teaming up on a study of how to manage their refuges in the Albemarle-Pamlico region as sea levels rise. The peninsula is crisscrossed by canals connected to the sounds, constructed to drain the land for timber and agricultural production. Dennis Stewart, manager of the Alligator River National Wildlife Refuge, is concerned that these canals may allow saltwater to permeate the peninsula, which would break down the peat soils and kill trees.

"We can't stop sea level rise, and we can't fill in the canals, but we do have water control structures that could be closed to prevent saltwater intrusion," Stewart said. "Our goal is to provide the highest-quality habitat for the widest range of species, especially federal trust species like the red-cockaded woodpecker."

Some people would like to see policies that allow barrier islands and marshes to migrate landward as sea level rises. North Carolina law currently prohibits hardening of beachfront property, but not soundfront property. "It's essential to leave space for shorelines to adjust to sea changes, and to promote stabilization methods that don't establish rigid, unmovable shorelines barriers," said Todd Miller, executive director of the N.C. Coastal Federation.

In August 2005, North Carolina joined nearly 40 other states in taking the initiative on global warming with passage of the N.C. Global Warming Act. The legislation established a 34-member commission whose charge is to consider potential impacts on the state from rising temperatures and evaluate recommendations on state goals for pollution reduction. The commission will also study how the state can prepare its economy to capitalize on emerging markets related to climate change.

Changes in global climate have been driven by forces that humans cannot hope to alter in the short term. But a growing number of organizations have joined state and local governments in seeking long-term solutions.

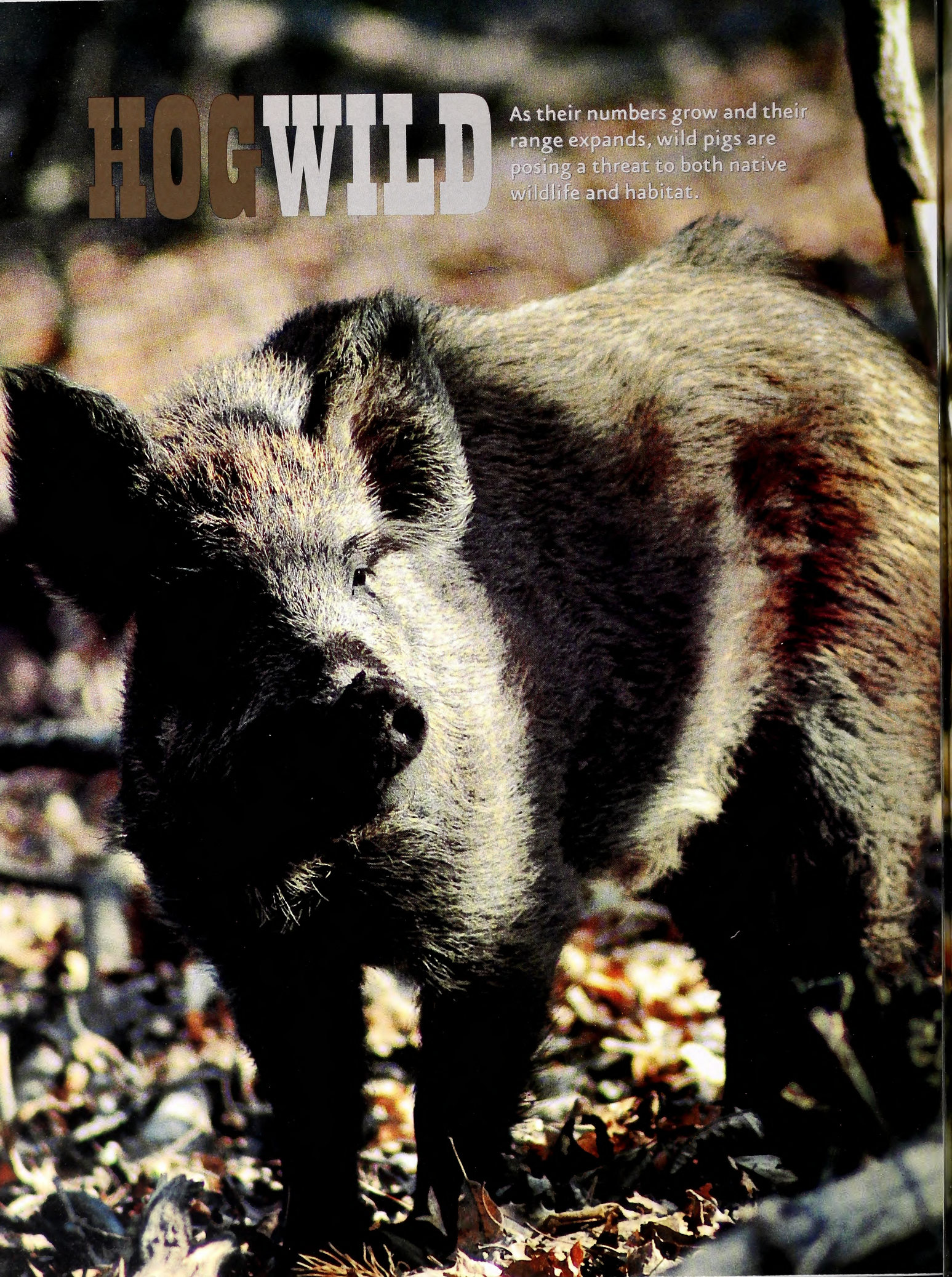
The same holds true for individuals. The choices we make, from the energy efficiency of our homes to the vehicles we drive, have a direct impact on the amounts of greenhouse gases released into the atmosphere. For the past century, carbon dioxide emissions, global temperatures and sea level have all been rising. Collective action now and in the future may be the only way to stem the rising tide. ◆

John Manuel is author of "The Natural Traveler Along North Carolina's Coast."

Scientists have produced several models of climate change. Unless otherwise stated, the author has used predictions developed by the United Nations' Intergovernmental Panel of Climate Change for this article.

HOG WILD

As their numbers grow and their range expands, wild pigs are posing a threat to both native wildlife and habitat.



Old-timers used the expression "when pigs fly" to dismiss the possibility of an unlikely event.

Given the growth of wild pig populations and their rapid expansion throughout North Carolina, the same folks might wonder if perhaps these crafty mammals have learned something from the birds and the bats. Over the last decade, biologists with the N.C. Wildlife Resources Commission have documented a remarkable increase in wild pig numbers in all areas of the state. Similar growth has occurred in other states, resulting in what some consider an ecological crisis.

To grasp the pig problem, it's important to understand where wild pigs originated. Native to Africa, Asia and Europe, the wild pig is the ancestor of all domestic swine. Known by a variety of names—wild boar, wild hog, wild pig, feral swine, razorback—the wild pig is one of the most prolific and adaptable of mammals, able to conquer new territories in short order. Depending on the region, a wild pig population in the United States may have descended from escaped domestic livestock or intentionally released wild pigs brought from the forests of Germany and Russia for hunting (or both). All pigs, domestic and wild, are the same species, *Sus scrofa*. Domestic varieties can quickly revert to the wild habits and physical characteristics hidden in their genetic code.

Historians disagree on when the first wild pigs came to North America. Many believe that Polynesians brought pigs to Hawaii as early as the first century A.D., but it would be another 1,400 years before pigs would find their way to the North American mainland. Christopher Columbus likely brought domestic pigs to Cuba in 1493 on his second voyage to America, and John Cabot is said to have brought them to the coast of New England in 1497. It is widely accepted that most 15th- and 16th-century English and Spanish explorers sailed over with domestic pigs—a walking, grunting and squealing pantry.

Pigs, as well as other non-native species such as horses, cattle and goats, proved to be robust and tough animals capable of surviving the weather and predators of the new continent. Pigs differed from other domestic livestock in one principal way: Given an opportunity, they could not only quickly adapt to the environment and do quite well without any assistance from humans, they also became wild, elusive and very difficult to manage or eradicate.

WRITTEN BY MARK JONES | PHOTOGRAPHED BY DAVID WOODY

History is full of examples of horses and cattle becoming "wild," but these species have always been relatively easy to round up and control. In suitable habitat, however, pig populations rapidly become established and have always been very difficult to control. The swamps and woodlands of southern states such as Florida, Georgia and South Carolina have for many years supported wild pigs. These populations originated from both intentionally released pigs and domestic hogs allowed to roam outside a fence, a common practice in the rural South.

Carolina Wild Boar

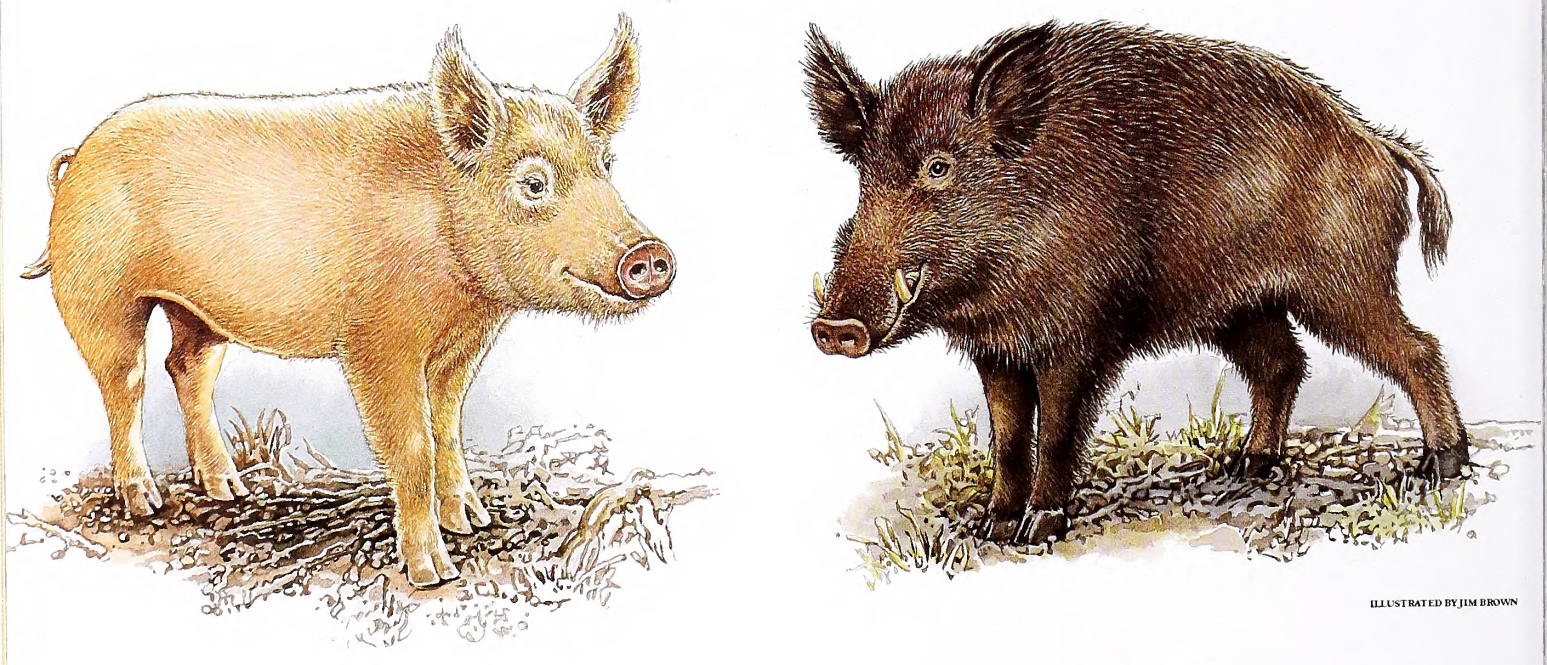
Today wild pigs are common in most states along the southern tier of the nation from Florida to Texas and California. In many areas of western North Carolina and eastern Tennessee where pigs have ranged for years, they have become an accepted part of the landscape.

The history of wild pigs in North Carolina is mirrored in many other states. In the spring of 1912, 13 Eurasian "wild boars" were introduced into a fenced enclosure on Hooper's Bald in Graham County for the purpose of hunting. Purchased from an agent in Berlin, Germany, the pigs were said to have come from the Ural Mountains of Russia, although their exact origin is uncertain. The herd increased to between 60 and 100 animals, and many of these escaped during the 1920s into Graham County and adjacent Monroe County, Tenn. The escapees thrived in the region's mountainous terrain and moved into the nearby Great Smoky Mountains National Park.

The wild population was later supplemented by intentional and accidental releases, and is now well established in many of the border counties. Wild pigs are particularly abundant within the boundaries of the 520,000-acre park. The National Park Service, which has a legal mandate to control exotic species and protect native species from competition, began a control program in 1977 that involved trapping and shooting wild pigs. Since then the park has removed more than 10,000 of the animals.

These removal efforts may have lessened the impact of wild pigs on native wildlife, but the pigs are still an important part of the ecosystem and likely will continue to be for the foreseeable future. The resilience of the park's wild pigs in the face of an intensive, government-funded control program demonstrates the challenge presented by this species throughout areas it inhabits. The difficulty of controlling wild hogs does not bode well for future management efforts on private lands, where money and resources are more limited.

Acknowledging the popularity of mountain wild pigs among hunters, the N.C. General Assembly designated the wild boar as a big-game animal in 1979. Today the wild boar is a prized trophy in many counties in far western North Carolina and in adjacent areas of eastern Tennessee. Seasons for North Carolina's wild boar run concurrently with the Mountain region bear season, opening



ILLUSTRATED BY JIM BROWN

DOMESTIC VERSUS WILD HOGS

Through natural selection over several generations, domestic pigs (left) living in the wild revert to a type that closely resembles their wild boar ancestors (right). Tusks, dark body coloration and thick body hair are advantages for pigs living in the wild. Pigs can produce several generations in a just a few years because sows reproduce as young as six months old. Each new generation may look "wilder" than the last.

the Monday on or nearest Oct. 15 and continuing until the Saturday before Thanksgiving. The season closes until the third Monday after Thanksgiving, when it reopens and continues until Jan. 1.

Initially, game status for the species was meant to protect the western North Carolina descendants of the Eurasian pigs that escaped in the early 1900s. Of the 14 western counties that report wild boar harvests, Graham led the way for 2004–2005 with 29 kills. Cherokee had 26, followed by Clay (18) and Macon (10). The total harvest was 110 boars, with 78 percent taken on game lands.

Private citizens have released pigs in other areas in recent years. The stock for these releases in many cases originated from wild populations of pigs in the Deep South that were simply trapped and moved to the state. Other stock came from domestic pigs that were allowed to revert to their wild characteristics. In North Carolina, biologists have seen a rapid expansion of wild pig populations across the Piedmont and even into several lower Coastal Plain habitats. An animal that once was restricted primarily to our most remote Mountain counties has become an ecological, financial and human health threat for the citizens of North Carolina.

A Plague of Pigs

Though popular as a game animal, the wild pig endangers native wildlife and plants. Wild pigs destroy vegetation and wildlife habitat by wallowing, rooting and feeding and are considered a threat to endangered plants in many parks and nature reserves. In Texas, where the animal has been established for many decades, wild pigs cause an estimated $100,000 in crop damage in some counties each year. While feeding, wild pigs damage pastures, hay fields, grain fields and even golf courses.

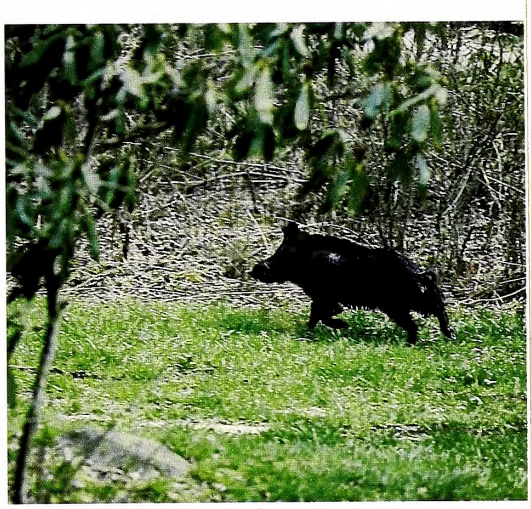
Because they lack sweat glands, wild pigs like to wallow in wet areas such as springs, ponds and streams to keep cool. This behavior causes soil erosion that can harm fish and aquatic resources. Studies have shown that wild pigs are significant predators of ground-nesting birds, reptiles and amphibians. The predatory nature of pigs is an economic concern in Texas, where some sheep ranchers lose an estimated 15 percent of their lambs to wild pigs annually.

Competition for food pits wild pigs against native wildlife. Wild pigs can consume significant quantities of mast—acorns, hickory nuts, berries—and limit food resources for black bears, white-tailed deer, wild turkeys, rodents and other species. Competition for mast could be particularly important in western North Carolina, where many species have few food alternatives. Long-term studies by the Wildlife Commission indicate that black bear reproduction and mortality in the Mountain region are closely tied to the availability of mast. During poor mast years, biologists see a decline in the number of cubs and an increase in bear mortality rates. Wild pigs competing for the same food resource could affect bear populations locally.

Ecological threats alone should be enough to make every outdoor enthusiast concerned about the spread of wild pigs, but economic and health issues exist as well. Wild pigs can carry several major diseases of concern to health officials, including trichinosis, leptospirosis, classical swine fever, swine brucellosis and pseudo-rabies. Each has the potential to affect people, pets and livestock. Most citizens have little to fear from direct contact with these diseases unless they hunt wild pigs or eat improperly prepared meat. Diseases such as trichinosis can be prevented by thoroughly cooking the meat of pigs before eating.

However, brucellosis and pseudo-rabies have the potential to create economic catastrophe for livestock industries at the state and national levels. Brucellosis is a bacterial disease similar to a disease once common in American cattle. In swine it causes abortions in females and infertility in males. Humans can be infected if they come into contact with the tissues of infected animals. Brucellosis is difficult to diagnose in humans and has many of the same symptoms as influenza, including fever, chills, sweating, joint pain, loss of appetite and weight loss.

Pseudo-rabies, although not a direct threat to humans, is a viral disease that causes abortions and stillbirths in pigs and increases susceptibility to other diseases. It can be carried and spread by pigs and is fatal to cattle, sheep, goats, dogs and cats, as well as raccoons, skunks, opossums, foxes and rodents.



Wild pigs adjust quickly to living in woods and swamps. A sure sign that pigs are in the area is damage to fields caused by their rooting behavior, which is aided by large tusks.

The USDA thinks there has been a marked increase in the movement of pigs into North Carolina in the past five years.

North Carolina's $2 billion domestic hog industry (second in the nation only to Iowa) depends on its status as being certified free of both brucellosis and pseudo-rabies. This designation from the U. S. Department of Agriculture (USDA) allows North Carolina complete access to world markets; loss of this status could devastate the industry. The discovery of brucellosis or pseudo-rabies in North Carolina's domestic hog industry could cost the state millions of dollars in efforts to remove the disease from livestock operations and would restrict the sale of swine to many states and foreign countries.

Feral swine can also spread foot-and-mouth disease and anthrax, a major threat to other livestock, including cattle. The 2001 outbreak of foot-and-mouth disease cost $7 billion in agricultural losses in Great Britain and resulted in the destruction of thousands of animals and quarantine of British beef.

The state's hog industry has had little to fear from wild pig populations in western North Carolina because hog farms are concentrated in the Piedmont and Coastal Plain. However, the dramatic spread of wild pigs into areas near major hog operations has created concern among agriculturalists. USDA officials study the situation by overlaying maps of swine production in North Carolina with the Wildlife Commission's range maps of wild pig populations. The USDA can then sample wild pigs in overlapping areas to check for the presence of brucellosis and pseudo-rabies.

Although both diseases have been found in wild pigs in North Carolina, no cases have been documented near major hog operations. But officials believe that swine released in hog-producing areas by hunters may come from states such as Georgia, which does have infected animals. The USDA thinks there has been a marked increase in the movement of pigs into North Carolina in the past five years.

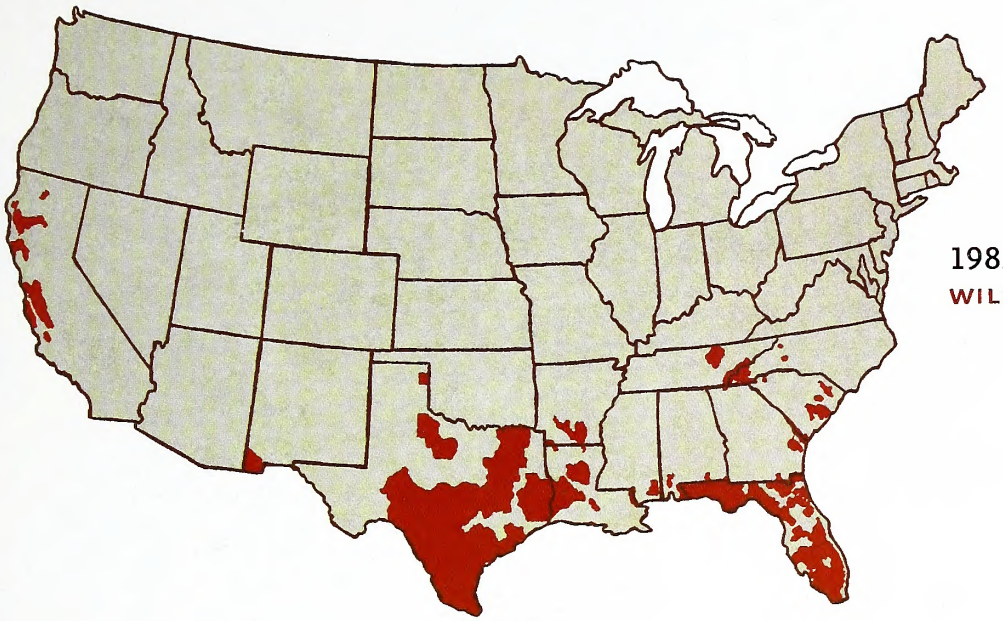
Agricultural research correlates with information collected by Wildlife Commission biologists and technicians, and all evidence points to a clear trend in the movement and release of wild pigs throughout North Carolina. Most of these pigs are moved by hunters and hunt clubs wishing to establish populations for sporting purposes, but the problems caused for wildlife, public health and farming would seem to outweigh any benefits individuals receive by introducing the animals for sport.

Outlook for the Future

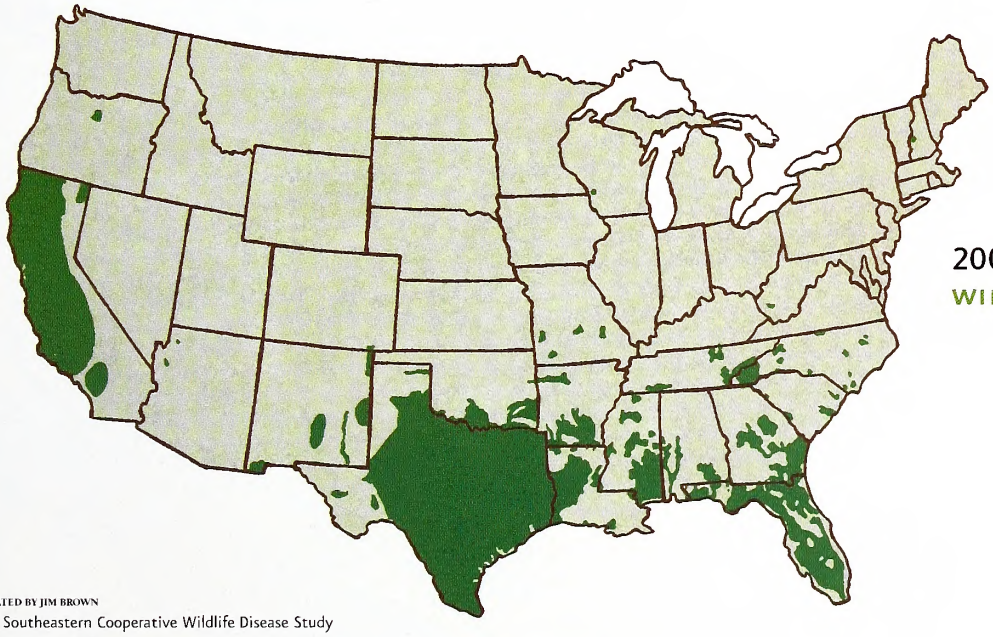
Florida, Georgia, South Carolina and Texas have tried for generations to eradicate wild pig populations. Their lack of success holds little promise for any proposed efforts to control wild pigs in some of North Carolina's most productive habitats. The best we can hope for in most circumstances is to stop the spread of the animals and contain wild pigs in current areas.

It is illegal to move domestic swine across state lines without proper documentation and tests for diseases. However, in the past citizens

Wild pigs can spread hoof-and-mouth disease and anthrax, both of which can infect domesticated livestock.



1982
WILD PIG POPULATIONS



2004
WILD PIG POPULATIONS

ILLUSTRATED BY JIM BROWN
Source: Southeastern Cooperative Wildlife Disease Study

have been allowed to move wild pigs within North Carolina. Effective Dec. 1, 2005, the Wildlife Commission made it illegal to release "any member of the family Suidae" into the wild. This new rule imposes a criminal penalty for releasing pigs or allowing them to roam free in North Carolina. The commission's enforcement officers are empowered to cite individuals who violate the new law.

Spreading the word about the detrimental impacts of wild pigs on native wildlife should help prevent future movement and releases. Some hunters may not realize that these diseases carried by wild pigs could affect not only their pets, including prized hunting dogs, but also their families.

Additional controls on wild pigs are being considered. Landowners could be allowed to kill free-ranging pigs on their properties at any time without the use of dogs (dogs may be used during the established wild boar season); hunters of wild pigs could be excused from the big-game reporting requirement; hunting regulations could be altered in all but the five southwestern Mountain counties (Graham, Cherokee, Swain, Clay and Macon); and wild pigs could be harvested during deer season with no bag limits. These measures have not been adopted; the Wildlife Commission and others are seeking the most effective management of wild pigs given the concerns of communities across the state.

Implementation of any or all of these measures might help stop the spread of wild pigs. However, based on the experiences of other Southeastern states, many populations in productive habitats will be all but impossible to eradicate. Whatever the future holds relative to regulations and laws, wild pigs represent an ecological menace that could affect North Carolina's native wildlife, plants and economy in irreversible ways. ◆

Mark D. Jones is the black bear biologist for the N.C. Wildlife Resources Commission and is also responsible for monitoring wild pigs in the state.

You think your life is weird? Welcome to mine!

I, of Newt

written by Jeff Beane / illustrations by Consie Powell / nature activity by Anne M. Runyon

I'M a red-spotted newt—at least, that's what you call me. We newts form a large family of salamanders. Salamanders are amphibians, which means we lead double lives—on land and in water. Welcome to my life.

Like you, I began life as an egg. But your mother carried your egg inside her body for nine months while it developed, and probably looked after you for years after you were born. Maybe she's still mothering you.

My mother stuck my egg onto a leaf in a shallow woodland pool and never looked back. Her 200 other eggs were also deposited singly and left to chance.

I developed inside my egg's protective jelly coating for a month before wriggling out into a greatly expanded, watery world. I was a third of an inch long, with feathery gills, tiny buds for front legs (no hind limbs yet) and a finlike tail. I was taught nothing—all I needed to know was genetically programmed. A copepod brushed my gills and I gulped it down—my first meal. Soon I was eating every tiny crustacean, insect or worm I could catch.

But I wasn't the only one hungry. If you think dragonfly naiads, diving beetles and water scorpions aren't scary, you've never seen one 10 times your size!

One day a spotted salamander larva, who looked rather like a bigger, hungrier version of me, bit a chunk out of my tail. I was lucky to survive. It's not easy being a newt larva.

I survived three months of this hide-and-seek, always growing and changing. My front legs grew, and my hind legs appeared. My gills began to disappear and lungs developed. My tail fin shrank. My skin thickened and turned orange. The pond was changing, too — getting shallower and warmer. I gulped air from the surface.

One night I left the drying pond, walked up into the woods and burrowed under some leaves. Two nights later it rained. I took a hike, heading away from the pond, up a forested hillside. By morning, I'd traveled a quarter of a mile. I hid under a log before daybreak. A worker termite crawled near and *snap!*, I snagged my first meal on land. Thus began my adolescence.

I lived mostly under logs and leaf litter, but I also patrolled the forest floor — usually at night, but sometimes on damp or cloudy days. (You won't see many salamanders out strolling in broad daylight, but my skin was thicker and drier than that of other species, and I tolerated air and sunlight better. I still needed to stay moist, though.) My skin also produced toxins that made me taste bad, so I had less need to hide. My bright orange color was a warning to anyone hungry enough to try me. I had become an "eft." The forest was my new home, and life was good.

After nearly two years of efthood, I changed again. I'd grown larger. I began to crave water, not knowing why. One rainy night, I took the longest walk of my life — nearly half a mile through the woods. By morning I was back at the pond where I was born. Frogs were chorusing. I slipped into the water.

Nature had turned me into a newt. I spent the next few weeks adapting to water again. No gills this time—I breathed through my skin and by gulping air. I ate water bugs, fairy shrimp, worms, tadpoles and amphibian eggs until I was over 4 inches long. My back was olive green; my belly bright yellow with tiny black dots. I'd kept the red spots on my sides. My tail again developed into a broad fin. It was larger than a female newt's, but I didn't know why yet. I also didn't know why I'd developed raised pads on my back legs.

Then one late winter day I met a lady newt who made me feel like dancing. I nudged her with my chin and fanned chemicals called pheromones into her face with my tail. Then I clasped her neck with my padded hind legs until she picked up one of the capsules—called spermatophores—that I had deposited.

She would store it inside her body for days, weeks or even months before using it to fertilize her eggs when she laid them, as my mother did, attaching them one by one to leaves or stems. Maybe one of them would survive to grow up like me, but I would never know.

Not all salamanders grow up like I did. Some (like the spotted salamander who tried to eat me when I was a larva) start out like me. But after transforming, they live the rest of their lives on land, returning to water only occasionally to breed. Others (like the slimy salamander I met under a log once) live their entire lives on land, spending their larval period inside eggs laid in damp burrows and hatching as fully terrestrial miniatures of their parents. Still others (like the dwarf mudpuppies in the creek a mile from my pond) never leave water, and grow up looking like giant larvae. It's all part of the different strategies we salamanders have developed over time to survive in a competitive world. Even we newts don't all grow up alike. Under certain conditions, we may skip the eft stage altogether, remaining in our ponds until we mature. Some of us spend only a few months as efts—others over three years. And once we become aquatic adults, we may revert to living on land—like a second childhood—if we have to. We newts are perhaps the most adaptable of all salamanders.

Get Outside

Want to see the likes of me? You're in luck—newts are found all over North Carolina. You'd do best to find an ephemeral pond—one that holds water only part of the time. But I can also live in permanent water, if there's enough vegetation to hide in. Beaver swamps, seepage pools, borrow pits and some farm ponds are all good places to find me. If the water's clear, you might see me swimming or floating near the surface. A dipnet or seine may give you a better chance of finding both larvae and adult newts. Look for efts under logs in woods near wetlands. You might also see us out walking on cool, damp days or crossing roads on rainy nights.

Read and Find Out

- "Red-spotted Newt" by Doris Gove, Atheneum, 1994.
- "A Salamander's Life" by John Himmelman, Scholastic Library Publishing, 1998.

In *Wildlife in North Carolina:*

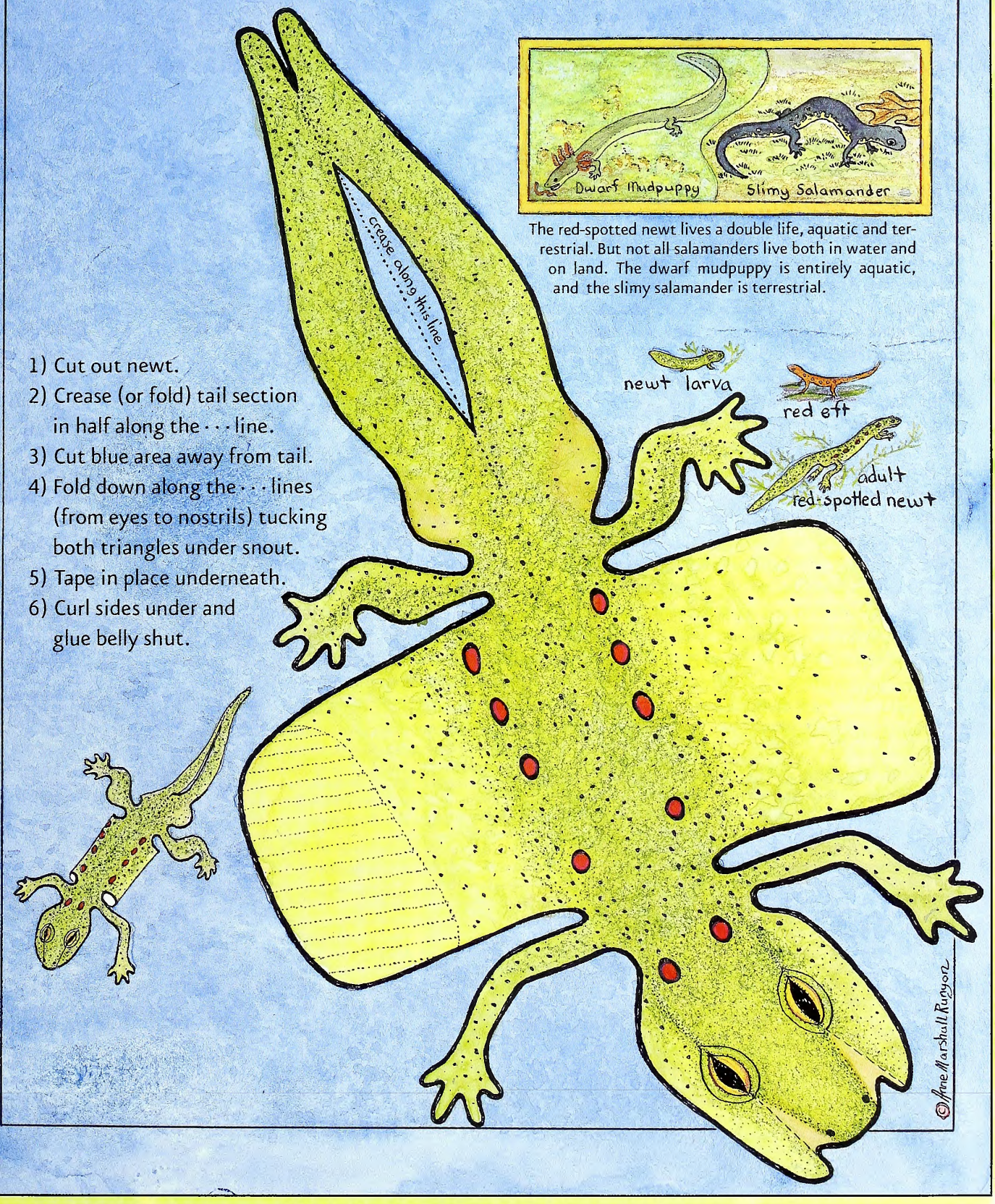
- "Back to the Pond" by Lawrence S. Earley, December 1991.
- "Being Amphibian" by Lawrence S. Earley, October 1997.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

An Adaptable Amphibian . . . a red-spotted newt sculpture

The red-spotted newt lives a double life, aquatic and terrestrial. But not all salamanders live both in water and on land. The dwarf mudpuppy is entirely aquatic, and the slimy salamander is terrestrial.

1) Cut out newt.
2) Crease (or fold) tail section in half along the · · · line.
3) Cut blue area away from tail.
4) Fold down along the · · · lines (from eyes to nostrils) tucking both triangles under snout.
5) Tape in place underneath.
6) Curl sides under and glue belly shut.



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Coastal Plain Hunters Form State's First QF Chapter

Sportsmen in the southern Coastal Plain have formed North Carolina's first chapter of Quail Forever. The Southeast North Carolina QF chapter will focus its efforts on improving quail habitat on the area's public lands.

Quail Forever was founded last summer by Pheasants Forever, a conservation group with over 20 years experience in maintaining and restoring pheasant habitat. Quail Forever uses the same funding model of its parent organization in that individual chapters determine how 100 percent of their locally raised funds will be spent.

"Bobwhite quail have always been a passion of the South, but their populations continue to plummet," said Peter Black, the N.C. chapter's first president. Black was a forester at Camp Lejeune for 32 years before retiring last year. "I've recently begun hunting pheasants in Nebraska, and I've seen the things Pheasants Forever has done for pheasants and quail there. Our chapter is hoping to improve the quail habitat, and consequently the hunting opportunities, in North Carolina's southern Coastal Plain through the same model that has been so successful for pheasants in the Midwest."

The new chapter plans to focus its habitat efforts on public lands, including national and state forests, military lands and state game lands. Public lands are increasingly important, Black said, because of limited opportunities for quail hunters. "You might find one wild covey on a farm, then another five miles down the road. I don't have those kinds of contacts. If you can't go to Croatan National Forest, Camp Lejeune or Holly Shelter Game Land, you're out of luck. It is important to our chapter to work on public lands where the next generation of quail hunters can experience the excitement of a busting covey."

Other Quail Forever chapters are in Illinois, Tennessee, Alabama, Kansas, Michigan, Mississippi, Missouri, Oklahoma and Texas.

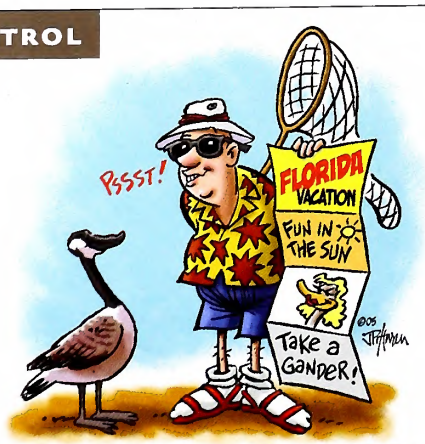
To learn more about the Southeast chapter, contact Peter Black at (910) 330-7712 or plblack@ec.rr.com. To learn more about starting a QF chapter, contact Jim Inglis at (419) 569-1096 or jinglis@quailforever.org.

The nation's first conservation group devoted to quail, Quail Unlimited, was formed in 1981 and remains very active in North Carolina. The group has 23 chapters and 2,820 members in North Carolina. Four QU chapters in the state are forming this spring. Nationally, QU has about 50,000 members.

Quail Unlimited continues to work on both public and private lands and has been involved with the N.C. Wildlife Resources Commission's Cooperative Upland habitat Restoration and Enhancement program (CURE) since its beginning. QU has provided more than $85,000 to CURE, in addition to 3,500 hours of volunteer labor. The QU regional director for North Carolina is Wade Teague, who may be reached at (919) 583-0932 or wteague@qu.org.

NCWRC

ON PATROL



ILLUSTRATED BY JACKIE PITTMAN

District Six officers Jeremy Harrill and Chris Moore investigated a report of Canada geese illegally held captive. When the officers arrived at the suspect's house, they noticed a large number of goose feathers scattered about, a net and some broken eggs. After an interview with a female suspect, the officers learned that she and a male suspect had gone to a local shopping center where they used bread and the landing net to catch two adult geese and seven goslings.

As the pair attempted to clip the birds' wings, one was able to fly away. The male suspect wanted a goose for his private pond, and since he was a resident of Florida, he had taken the goose and was en route to that state. Harrill contacted the Florida Fish and Wildlife Conservation Commission, and a wildlife officer was waiting in the man's driveway when he arrived from North Carolina. One adult Canada goose with clipped wings and seven goslings were found in the vehicle. The man was charged with violations in both states.

Count Your Backyard Birds

Feeling cooped up during the February cold? Why not get out with your family and count birds in the Great Backyard Bird Count? Even if you're not inclined to brave the cold, you can still participate by counting birds at your feeder. You don't have to be restricted to your backyard. You can count birds anywhere, including state parks or national forests.

From Feb. 17 through Feb. 20, people in North Carolina, along with those all across the United States, are encouraged to count birds by species and number in their communities and report them over the Internet. This is the ninth year of the count, which is managed by the Cornell Lab of Ornithology and the National Audubon Society.

In February 2005, participants submitted 51,926 checklists (an increase of 22 percent over 2004), with 613 species observed and 6.5 million individual birds counted. The results of the count help researchers better understand bird population numbers and distribution.

In 2005, North Carolina ranked second nationally in checklists submitted, with 2,697. Charlotte and Wilmington ranked among the top 10 cities submitting checklists.

Across North America, the Northern cardinal appeared on the most checklists (29,456), followed by the mourning dove (28,745) and the dark-eyed junco (24,029). The most numerous birds were the snow goose (835,369), Canada goose (688,715) and red-winged blackbird (480,989).

The Northern cardinal also was the most sighted bird in North Carolina, listed on 2,193 checklists. The American goldfinch was the most numerous species, with 12,190 recorded.

For more information and instructions on filling out a checklist, visit www.birdsource.org/gbbc.

	2005 CHECKLISTS SUBMITTED	TOTAL BIRDS REPORTED
Northern cardinal	2,193	11,039
Carolina chickadee	1,840	5,485
Mourning dove	1,829	8,963
Tufted titmouse	1,700	4,760
Carolina wren	1,493	3,094
Dark-eyed junco	1,409	9,214
American goldfinch	1,344	12,190
Red-bellied woodpecker	1,238	1,686
Blue jay	1,208	3,248
House finch	1,135	4,610
Northern mockingbird	1,084	1,816
American robin	1,065	11,630

Check Off for Nongame

North Carolina can claim more than 1,000 nongame mammals, reptiles, birds, amphibians, mollusks and crustaceans. Nongame wildlife includes all wild animals except those that can legally be taken by hunting and fishing. Many nongame species are common and can be viewed in your own backyard. Others are rare and seldom seen.

The Nongame and Endangered Wildlife Program strives to prevent species from becoming endangered through maintaining viable, self-sustaining populations of all native wildlife, with an emphasis on species in decline.

The Nongame Program is part of the Division of Wildlife Management of the N.C. Wildlife Resources Commission. Funding for the Nongame Program is provided in part by the N.C. Tax Check-Off for Nongame and Endangered Wildlife. The tax check-off enables North Carolina taxpayers to donate a portion of their state income tax refund to nongame wildlife conservation.

To contribute to the Nongame and Endangered Wildlife Fund, please enter an amount on line 26 of your North Carolina income tax form. If you are not eligible for a refund but would still like to contribute towards nongame wildlife conservation, send your donation to: Nongame and Endangered Wildlife Fund, 1722 Mail Service Center, Raleigh, N.C. 27699-1722. All donations are tax-deductible.

Since it began in 1983, the Nongame Program has funded projects to help sea turtles, bald eagles, peregrine falcons, freshwater mussels and many other native species.

NORTH CAROLINA NONGAME & ENDANGERED WILDLIFE FUND

World's Edge Is Latest Park System Gem

The edge of the world might be a lot closer and more accessible than you think. Just last summer, the Carolina Mountain Land Conservancy and The Nature Conservancy purchased 1,500 acres of waterfalls, sheer cliffs, forested slopes and dramatic views known as World's Edge. Located 15 miles southeast of Asheville, the $16 million property will become part of a new Hickory Nut Gorge State Park. The park was authorized last year by the N.C. General Assembly.

World's Edge contains a mile-long set of steep slopes on the eastern edge of the Blue Ridge Escarpment, with more than 20,000 feet of streams and waterfalls. The land falls away to provide a stunning view of the Piedmont. Unique cave-dwelling invertebrates, rare flowers, a variety of forest communities and an array of animals such as endangered bats, salamanders, peregrine falcons and migratory neotropical birds dwell there. The noncontiguous property extends into Henderson, Polk and Rutherford counties.

"We've been excited about the idea of a state park at Hickory Nut Gorge for a long time, and that idea has moved from possibility to probability in just a matter of weeks," said Lewis Ledford, director of the N.C. Division of Parks and Recreation. "It shows what can be accomplished with such committed partners as The Nature Conservancy, the Carolina Mountain Land Conservancy, the local community and the General Assembly."

Farmers Can Get Paid for Helping Wildlife

North Carolina farmers can still sign up for a federal program that pays for bobwhite quail habitat on field borders. The Upland Bird Habitat Buffers initiative is part of the federal Conservation Reserve Program, which compensates farmers who set aside sensitive areas to protect water quality and other environmental assets. Bobwhite quail, once prolific throughout the Southeast, have declined dramatically since the 1960s, mostly due to loss of habitat.

Field borders provide the weedy, grassy habitat that quail require for food, cover and nesting. Although landowners are not required to plant the buffers, they must agree to manage the enrolled acres periodically to keep out trees. In return, farmers receive payments for up to 10 years on less productive field edges.

"The Upland Bird Habitat Buffers initiative provides landowners a strong incentive to improve habitat through a signup bonus, annual rental payments and cost share for maintenance," said Terry Sharpe, agricultural liaison biologist with the N.C. Wildlife Resources Commission. "These incentives are much greater than the Wildlife Commission could have provided on its own."

The U.S. Department of Agriculture administers the program through local Farm Service Agency offices. The Natural Resources Conservation Service and the Wildlife Commission provide technical expertise to participants. As part of the Northern Bobwhite Quail Habitat Initiative, the program will enroll up to 250,000 acres nationwide. North Carolina has been designated for 11,300 acres —more than any other state in the Southeast. Tar Heel farmers thus far have enrolled about 6,000 acres.

Enrollment will remain open through December 2007 or until the state allotment is used. Compensation includes a one-time signing bonus of about $100 per acre enrolled, an annual maintenance payment of $5 per acre and a management payment of up to $100 per acre over the 10-year lifetime of the agreement. Interested landowners should contact a Farm Service Agency office and ask for enrollment applications for practice CP33, Upland Bird Habitat Buffers.

CALENDAR OF EVENTS

Friday–Sunday, Feb. 10–12

Check out the unveiling of the 2006 N.C. Duck Stamp print at the 11th annual East Carolina Wildlife Arts and Decoy Carving Festival in Washington. The festival also features calling and carving competitions. Call (252) 946-2897 or visit www.eastcarolinawildfowlguild.com.

Tuesday, Feb. 14

Learn about the wildlife of Cape Lookout National Seashore through a slide presentation and field trip with the N.C. Maritime Museum. Program begins at 11 a.m. Contact (252) 728-7317 or visit www.ah.dcr.state.nc.us/sections/maritime/default.htm.

Friday–Sunday, March 3–5

See some of the top white-tailed deer taken in North Carolina over the past year, plus the latest in hunting and outdoor equipment at the 26th annual Dixie Deer Classic on the N.C. State Fairgrounds. Hunters also may have deer jawbones aged by Wildlife Commission biologists and have their mounts scored by the Boone & Crockett method. Contact (919) 782-5333 or visit www.dixiedeerclassic.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org,or call (919) 707-0177.

IN SEASON

This month, these hunting seasons are open in North Carolina:

Bobcat: Through Feb. 28.
Common Snipe: Through Feb. 28.
Crow: Wednesday, Friday and Saturday of each week through Feb. 28.
Opossum and Raccoon: Through Feb. 28.
Pheasant: Through Feb. 1.
Quail: Through Feb. 28.
Rabbit: Through Feb. 28.
Ruffed Grouse: Through Feb. 28.
Snow, Blue and Ross' Geese: Through March 4.
Trout: Through Feb. 28 on hatchery supported waters.
Youth Waterfowl Hunt Day: Feb. 4. See *Regulations Digest* for details.

Check the *2005-2006 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps, or visit www.ncwildlife.org.

Oyster Gardening Program Taking Applicants

If you own a pier or dock in North Carolina coastal waters and are interested in growing oysters, the state has a deal for you. After a year-long trial run, the N.C. Division of Marine Fisheries has launched a much-anticipated program that allows qualified applicants to grow oysters in containers under docks and piers ("Oyster Gardening," Sept. 2004).

To be eligible for the free Under Dock Oyster Culture permit, applicants' piers must be located in waters open to shellfish harvest. Applicants must also review an educational manual and pass a quiz in order to ensure they understand the legal requirements and safety precautions that must be taken when harvesting oysters. The application package is available from Marine Fisheries offices or online at www.ncdmf.net/shellfish/UDOC1.htm.

Successful applicants will be allowed to grow native oysters in containers or cages attached underneath their docks. Oyster gardeners may consume the shellfish they grow, but sale of these oysters is prohibited. For more information, contact Craig Hardy at craig.hardy@ncmail.net or 1-800-682-2632 or (252) 726-7021.

NCWRC

How Does A Pickerel Pluck Its Prey?

written by Clyde Sorenson
illustrated by David Williams

COMPARED TO OTHER PREDATORS like the largemouth bass, a pickerel feeds on large fish. It ambushes its prey from a cover of dense weeds.

As the pickerel nears its prey, it drops the floor of its mouth, creating negative pressure. When the pickerel is within a couple of inches of its prey, it opens its mouth, sucking in the prey like a vacuum cleaner. The fish's capacious mouth not only accommodates large prey—it allows for greater suction.

When a potential meal draws near, the pickerel closes in with a lightning-fast, two-part strike. A 24-inch pickerel can cover 8 inches in less than 1/10th of a second by whipping its body in two successive opposite "S" curves.

The in-rushing water is expelled through the pickerel's gills while the prey is held fast by the predator's many large teeth. A pickerel grabs its prey crosswise, then rotates it and swallows it headfirst. Fish with smaller teeth, like the bass, usually suck in their relatively smaller prey with one gulp.

A Sportsman's Guide to Wine

written by Jim Dean

With all the emphasis on quality of life experiences these days, sooner or later, we knew this was going to happen. Somewhere, as the traditional post-outing libations are being quaffed, a hunter or fisherman has admitted that, all things considered, he'd rather have a nice glass of chardonnay than a Bud Light. Moreover, he prefers that it be a flinty, dry French version with a hint of mineral and pear on the nose as opposed to one of those overly oaked and insipidly buttery California chardonnays.

ILLUSTRATED BY JACKIE PITTMAN

And at least one of his astonished buddies—after joining the raucous hoots and insults that follow—has meekly confessed that he, too, might like to try a wee glass. Pretty soon, everyone has their snouts deep in $40 stemware, discussing killer vintages, natural maceration, cork taint and the curious 2002 drought that spelled disaster in the Rhone Valley, yet created the finest Burgundy of the century not far away.

"Ah, yes," says one of the newly decadent participants. "There's a chewy aroma of Hoppes No. 9 powder solvent on the nose, with nuances of 6-12 insect repellent and fruity Hawaiian Tropic sunscreen on the palate. There's also a lingering hint of red wigglers and dog-box shavings on the finish. This would pair very nicely with a sautéed elk haunch, a tin of Vienna sausages or a liverwurst, onion and Gorgonzola cheese sandwich."

"There's a chewy aroma of Hoppes No. 9 powder solvent on the nose, with nuances of 6-12 insect repellent."

Admittedly, the evolution of cast-and-blast rednecks into wine connoisseurs is an unlikely transformation, but there is historical precedence. Wine has a historic connection with shooting and angling, particularly among European sportsmen who traditionally have paired fine clarets with Purdey shotguns and upland birds or Hardy cane rods, brown trout and salmon. Indeed, the late Ernest Hemingway—the quintessential American sportsman—had the good sense during the invasion of Paris to liberate the Ritz-Carlton wine cellar so that he and his fishing buddy Charlie Ritz would be amply hydrated as they fly-fished for trout once things quieted down.

As for my own interest in wines, I tell people that it all started because I was collecting corks to make popping bugs for largemouth bass and bluegills, and it seemed a waste to pour out the wine. Besides, if a cork proved too crumbly to make a good bug, it was necessary to uncork another bottle. Things got out of hand.

When it comes to emerging obsessions, a little knowledge is a dangerous thing, and soon you are not only hooked, but offering advice. "What goes well with that?" a customer asked me one day while I was buying some riesling.

"This is the perfect pompano- and spot-fishing wine," I announced confidently. "Bait up a bottom rig, sit on a sunny beach and pour yourself a crisp snort."

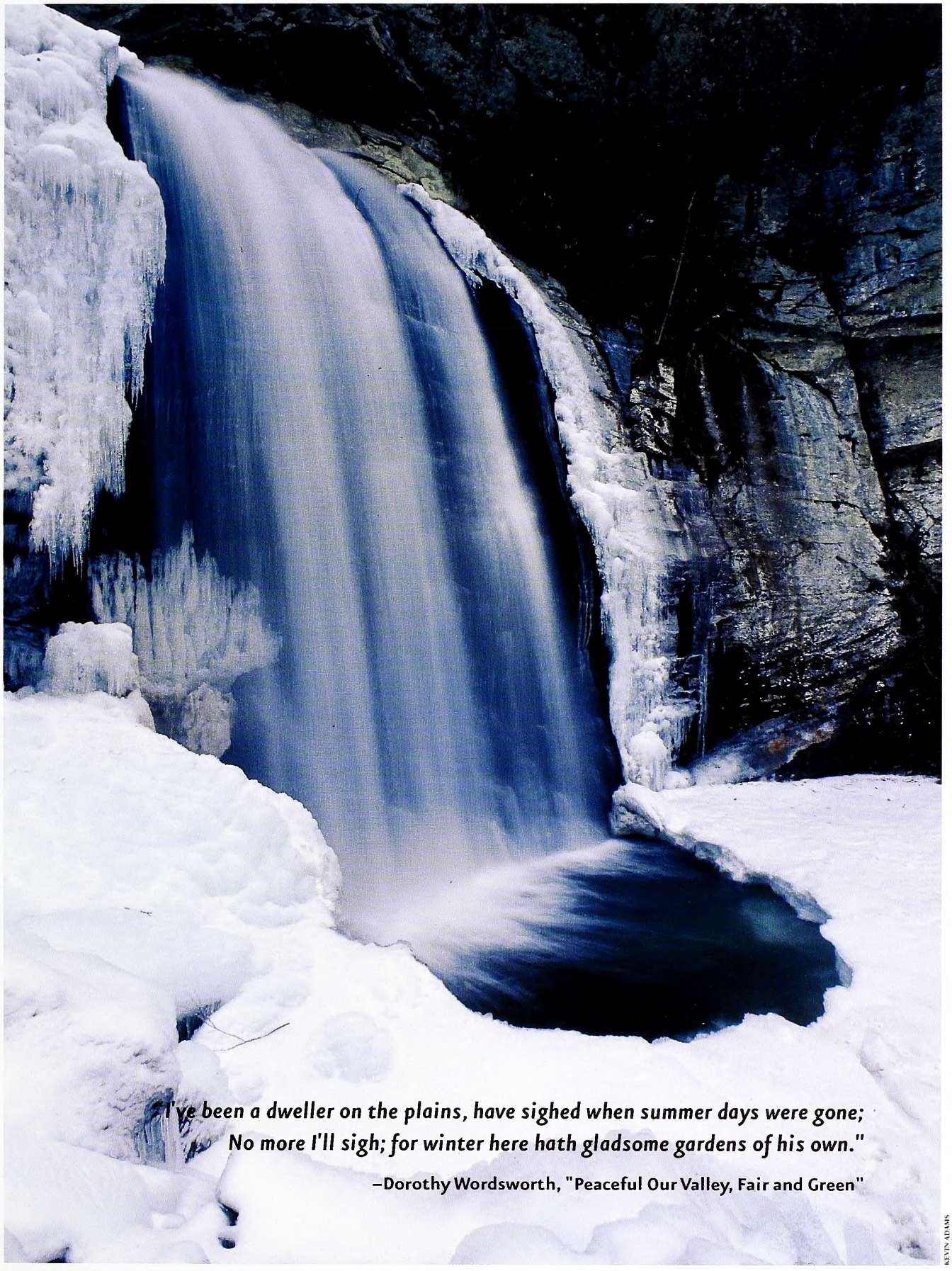
There are numerous ideal pairings of foods and fermentations, and not merely the old chestnut of Sancerre and oysters. Duck and deer hunters will opt for a robust cabernet, Bordeaux or red zinfandel to wash down their kill, while quail and woodcock hunters may prefer a Barolo or a lovely Rioja. The grayling enthusiast must have gruner veltliner. Bass fishermen will be rewarded with a grenache or syrah, while the rainbow or brown trout angler will almost certainly choose pinot noir. For bluegills, it's Beaujolais—or possibly Mad Dog.

Which brings us to the movie "Sideways," which has been for wine lovers what "A River Runs Through It" was for serious trout fishermen—a seductive disaster with too many enraptured newcomers crowding the venue and depleting the resource. By the way, one of the protagonists in "Sideways" refuses to drink merlot, but guess which grape dominates the highest priced French Bordeaux wines?

If wine seems like an intriguing enhancement to your favorite sport, you should know that there are many outstanding choices available for $8 to $15 a bottle (Night Train ain't one of 'em). You're likely to find the best values from Australia, South America and, especially, Spain and France (if you're not still bugged by the late unpleasantness). Despite increasing popularity and prices, Italy also still has affordable winners, and so does California (though its cult wines are outrageously priced).

But beware. Once you get started, retreat may prove difficult—kind of like probing a bear trap with your foot. One of my sporting companions has developed such obsessive enophilia that he now uses only single-vineyard estrus to attract bucks to his stand.

On a recent trout-fishing trip, he opened the trunk of his cluttered station wagon to retrieve his gear. As he was pulling out his fly rod and waders, he dislodged a $75 bottle of Burgundy that rolled out, bounced on the trailer hitch and shattered on the pavement. We silently watched the red stain spread among the shards. "Well," he said sadly. "A least it had an exceptional finish."



"I've been a dweller on the plains, have sighed when summer days were gone;
No more I'll sigh; for winter here hath gladsome gardens of his own."

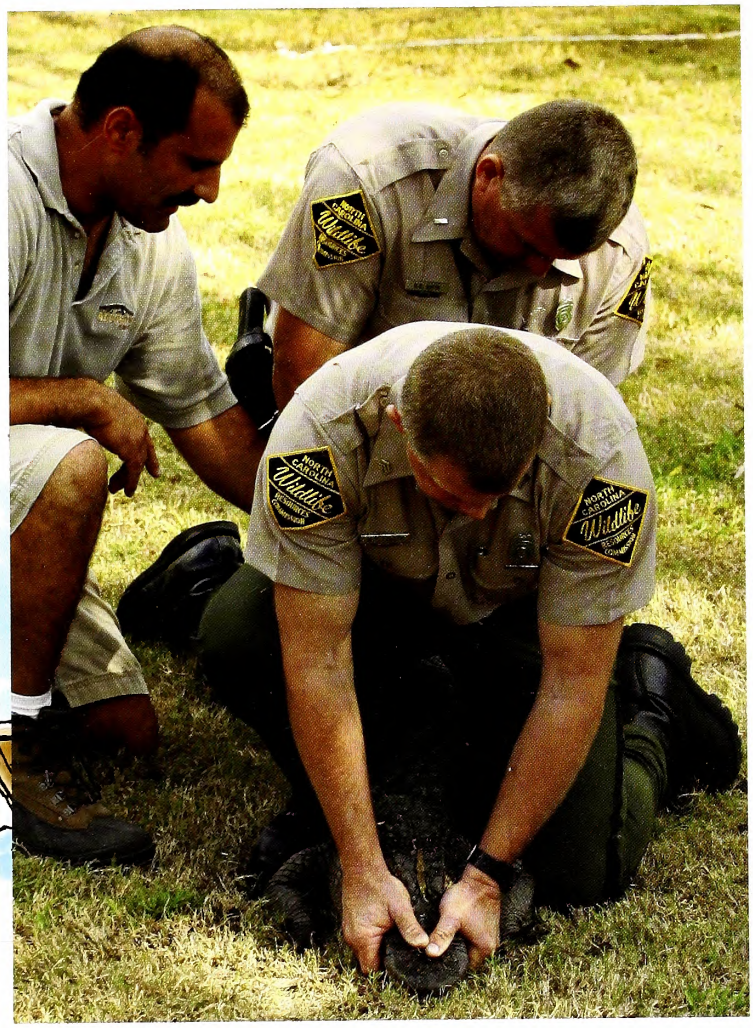
–Dorothy Wordsworth, "Peaceful Our Valley, Fair and Green"

KEVIN ADAMS

OUTDOOR MOMENT

Looking Glass Falls

IN THE MARCH ISSUE



NCWRC

GATOR IN THE GARAGE
Relocating stray alligators is all in a day's work for wildlife officers in parts of the Coastal Plain. What does it take to escort a 5-foot-long reptile with *T. rex* jaws?

PARKWAY TROUT
Miles of mountain streams and acres of ponds and lakes lure travelers on the Blue Ridge Parkway. An experienced angler recommends some choice spots.

URBAN TRAILS
Big-city greenways offer residents a welcome escape from noise and traffic. Plans afoot will link more trails for the benefit of wildlife, too.

FIND US ON THE WEB AT ncwildlife.org

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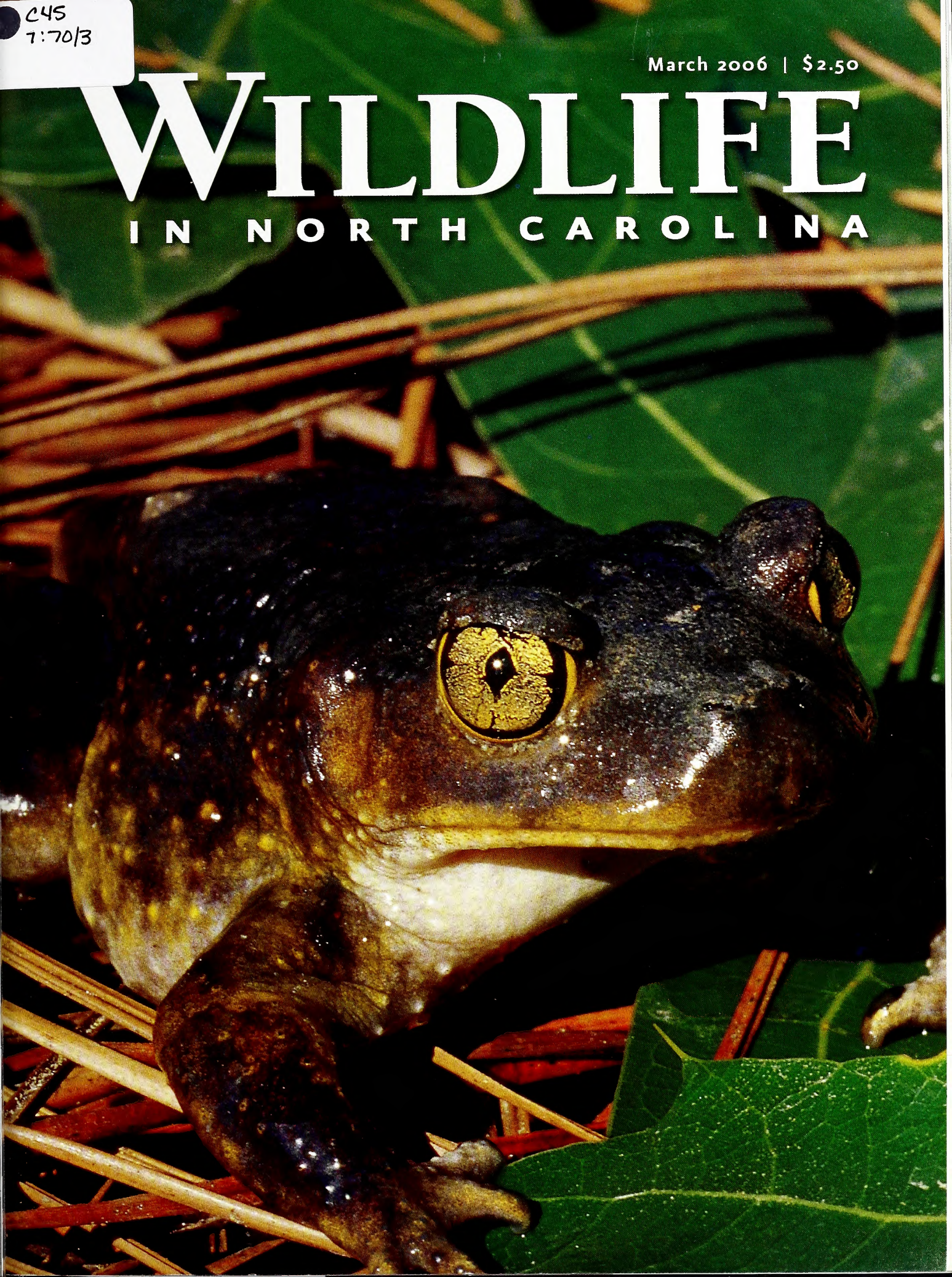
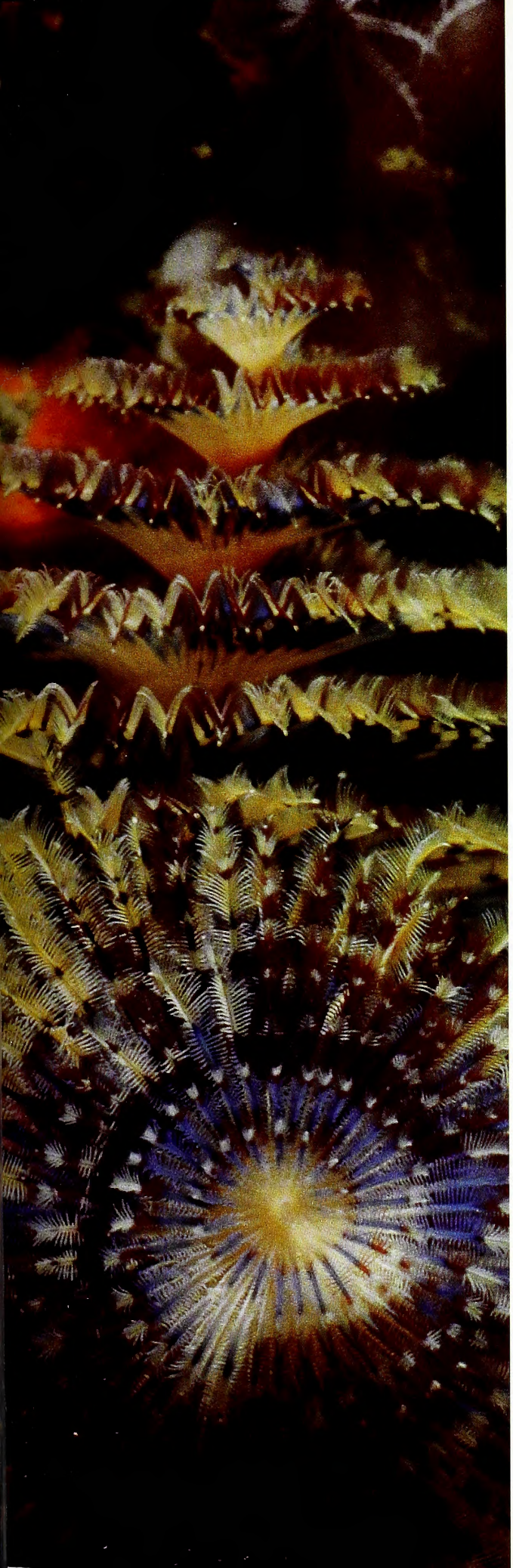
WILDLIFE IN NORTH CAROLINA



A close-up look at blue and yellow Christmas tree worms reveals the diversity of wildlife on North Carolina's continental slope. The hardbottom ledges extend for miles into the Atlantic Ocean. **PHOTOGRAPH BY RICHARD TRIEBE.**



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Cover: The deafening chorus of breeding Eastern spadefoots is typically heard during periods of stormy weather. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

"March is a fine month for remembering," wrote Robert Ruark, mainly because hunting season is over and it's too early to fish. Ruark's immensely popular column "The Old Man and the Boy" recalled his boyhood spent in the outdoors around Southport. The essays first appeared in *Field and Stream* magazine in the years after World War II. Collected in a book with the same name as the column, the essays have stayed in print for 50 years.

Jim Dean's column, "Our Natural Heritage," has served a similar purpose for *Wildlife in North Carolina* since it began in 1978 (counting this month, that's an unbroken chain of 339 essays.) This month's column is a fine one for remembering, itself (see page 40). Jim describes the contributions of several talented people, but what he doesn't reveal is also telling. While he was editor of this magazine, UNC Press published 50 of his excellent essays in "Dogs that Point, Fish that Bite." After Jim retired in 1998, more columns and some of his articles from *Field and Stream* appeared in "The Secret Lives of Fishermen."

Jim Dean brought his son Scott along on many a sporting trip. This previously published photograph was taken in 1974.

Jim's tales of the outdoors pick up where Ruark left off (Jim was just hitting his stride as a journalist when Ruark died in 1965). He has entertained us over the years by dipping into memories of hunting and fishing with his father and grandfather during his 1950s boyhood in eastern North Carolina. He has shared his wide-ranging and rather eclectic passions, from handmade bows and pocket knives to the care of iron skillets to wines for game (just last month). For my money, his work has kept the art of outdoor prose thriving in North Carolina.

In his October 1979 column, Jim wrote, "A friend of mine said that he envied anyone reading 'The Old Man and the Boy' for the first time." If you haven't yet dipped into the collected works of "Our Natural Heritage," I envy you the opportunity. Read Jim's books; it's a fine month for remembering.

Margaret Martin

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WILDLIFE IN NORTH CAROLINA

MARCH 2006 VOLUME 70, NUMBER 3

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Sharp Focus

The photography in the January 2006 issue was unusually fine. It is heartening that there are so many talented North Carolinians interested in wildlife photography, which made your task of selecting winners difficult indeed.

Jon Maxwell
Greensboro

I have a question about submitting photos to the wildlife photo contest. Do you have to be a subscriber to the magazine to submit photos?

Cathy Cranford
Hope Mills

One need not subscribe to the magazine to enter the photo competition, which is open to everyone. The only requirements are that photos are entered properly online and conform to the rules, which can be viewed at www.ncwildlife.org. Rules will also be printed in the June issue, which will announce the opening of the 2006 competition. Start taking those great wildlife photos now so you will be ready to enter!

Bait Befuddlement

I am a lifetime licensed fisherman in North Carolina. I was born in the foothills of the Blue Ridge and now reside near the South Mountains. Having fished and caught trout almost all my life, I was wondering on the rules and regulations of using Power Bait, Gulp! (soft plastic lures) and other baits. Are these legal in hatchery-supported streams if using a single hook? A park ranger said this was a gray area and that is what made me ask the question here.

Brent Simmons
Lawndale

Kent Nelson, assistant chief, NCWRC Division of Inland Fisheries: Streams identified as Hatchery-Supported Trout Waters, in contrast to Wild Trout Waters, have no lure restrictions. Only artificial lures having a single hook may be used in Wild Trout Waters. Some public trout waters have special regulations that limit bait to artificial flies or artificial lures. In these waters, natural bait, defined as any bait that can be beneficially digested by fish, is prohibited. In most instances "power baits" are not composed of digestible materials and therefore are considered artificial lures. Delayed Harvest Trout Waters require that artificial lures with a single hook be used during the catch-and-release period only (from the first Saturday in October through the first Saturday of June). During the remainder of the year when trout may be harvested, there are no bait restrictions.

Something to Howl About

I found the article "Bad Rep for Coyotes" (Dec. 2005) quite informative. However, based on my experiences with coyotes in Michigan, I feel that a few of the comments are off base, especially those about how increasing coyote populations will not affect some of the other wildlife species — specifically, quail, turkey and deer. I understand that there are many differences in the population densities of wildlife and habitat differences between Michigan and North Carolina. But a coyote is a coyote. They will eat what they can catch, and their numbers will grow until the food source is gone.

When coyotes moved into our area of Michigan, it was a pretty exciting thing to hear their calls in the evening and catch an occasional glimpse of one. But it didn't take long for the rabbits to disappear, shortly followed by the turkeys and partridges. The nesting hens, eggs and chicks didn't stand a chance. Once the coyotes cleaned up the easy targets, they started culling off the deer. Where we once saw lone does with a fawn or two, we started seeing larger groups of 5 or 6 adult does with maybe a yearling or two with them. There was some safety in numbers, but we witnessed on several occasions just how effective coyotes are at separating younger deer from does.

With this continuous culling of the yearlings we saw a deep reduction of deer numbers in our area. Within four years of our first coyote sightings we experienced a huge reduction in wildlife numbers, with the exception being coyotes. Now, near dark, it is not uncommon to hear several packs howling at a time, and we see them just about everywhere. Even opening hunting and trapping seasons has not seemed to slow their increasing numbers. I feel the biologists in our area underestimated the amount of game a pack of coyotes can consume and how quickly they can decimate game numbers. I just hope this is not the case in North Carolina.

Jack Brautigam
Winnabow

Things that Make You Go Hum

The article "Hummingbirds in Winter" in the Nov. 2005 magazine answered a question that was not available in any of my three different bird identification books. In the summer of 2004 we had a hummer with a brilliant golden chest that stayed with us for the entire summer. He took command of two hummingbird feeders on two sides of our house by positioning himself on a limb near the corner so he could see both feeders at the same time. Finally, the ruby-throated hummers would gather so that as he chased away a single bird, the others had an opportunity to feed. Sadly, he did not return last summer so we could enjoy his antics. Thanks to the article, I now know that Allen's hummingbirds have been seen in North Carolina.

Ken Roberson
Fairview

write us

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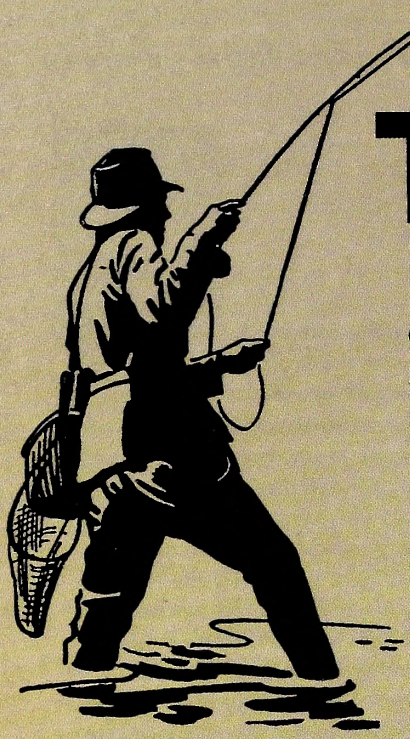


TROUT Travelogue

GREAT FISHING IS JUST A STONE'S THROW OFF THE SCENIC BLUE RIDGE PARKWAY.

A rainbow trout got me in trouble on the Blue Ridge Parkway 21 years ago this May. On a beautiful Saturday afternoon, we were on a picnic across the parkway from Sims Pond in Watauga County. Our two best friends were enjoying the afternoon with me and my wife, who was a week short of giving birth to our oldest daughter.

Jimmy and I had broken out our fly rods, promising that we'd spend just a few minutes trying to see if we could raise a few fish in the Boone Fork of the Watauga River, which crossed under the parkway and skirted the picnic grounds. Jimmy stayed around the edge of the woods. I went prospecting.

About 200 yards deep into the woods, I spied a fish rising at the end of a long pool, just downstream from a tree that had fallen into the water. Five casts in, the fish rose and missed the fly—I think it was a No. 12 Adams—with a splash. That only whetted my appetite. I guess 10 or 20 minutes passed before I got the perfect drift again, and this time, the fish didn't miss.

Neither did I. In no time, I had a 14-inch rainbow trout in the little net that clipped onto my vest. When I emerged from the woods, brandishing the rainbow and two more small brook trout on a stringer, the atmosphere had become somewhat chilly. "How could you leave me alone for that long?" my wife asked. "I'm about to have a baby. You must not care about me at all." It was a long 90-minute ride home. It seemed that I had chosen a rising trout over my more important duties as a husband.

In my defense, fishing in streams just off the Blue Ridge Parkway can be good to the point of distraction. I have been back to the parkway countless times since, with fly rod or spinning rod in hand, and I've never forgotten that trip, which produced the first rainbow trout I caught in North Carolina. I've dunked kernels of corn and earthworms, run spinners past likely looking midstream boulders, and flipped flies so tiny that I had a hard time seeing them float past.

The parkway winds 469 miles through Virginia and North Carolina, starting at the Shenandoah National Park near Waynesville, Va., and ending at the entrance to the Great Smoky Mountains National Park at the Oconaluftee Visitor Center. North Carolina's section of the parkway, which ends at Milepost 469, starts around Milepost 216 at Cumberland Knob, land that was originally surveyed in 1749 by Peter Jefferson. His son

WRITTEN BY DAN KIBLER | PHOTOGRAPHED BY RICHARD BERNABE

Thomas would later write the Declaration of Independence, found the University of Virginia and serve as our third president of the United States.

Parkway property covers more than 93,000 acres, including 75 miles of mountain streams and 66 acres of impounded ponds and lakes. Trout live in almost all of those streams—dainty brookies at the highest elevations, rainbows down a little lower and brown trout at the lowest elevations. The N.C. Wildlife Resources Commission manages a third of the parkway's streams in North Carolina as part of its Hatchery-Supported Trout Waters program. Those streams, plus the wild trout waters that course around and through the parkway's mountaintops and ridges, provide just about all of the opportunities that a trout fisherman could ever want.

The parkway was built from the mid-1930s through the late 1980s, when the last section, the Linn Cove Viaduct, was completed. The original idea was to build a road that would connect the Great Smoky Mountains National Park with the Shenandoah National Park—the "Appalachian Scenic Highway" it was called originally. But as much as for transportation, the parkway was a project that provided jobs in the Civilian Conservation Corps for thousands of people in the throes of the Great Depression. That the ribbon of asphalt could bring people closer to good trout fishing was an added bonus.

NORTHERN SECTION

From Brush Creek and Big Pine Creek a few miles south of Cumberland Knob to the Middle Prong of the Pigeon River near Devil's Courthouse south of Waynesville, opportunities abound for fishermen with a rod and reel and a sense of adventure. Anglers can fish from one end of the parkway to the other with either a Virginia or North Carolina license—no trout stamp required. However, because it can be difficult at times to tell when you have crossed over from federal land to an area where more stringent state regulations apply, it is highly recommended that you possess an N.C. Comprehensive Fishing License.

In general, access to streams is easier the closer you get to the Virginia line, because the stretches of the parkway through Avery, Watauga, Ashe, Wilkes and Alleghany counties don't tend to hug the ridgelines. In fact, there are long segments where travelers are in relatively low country, paralleling streams as they course through woods and farmland.

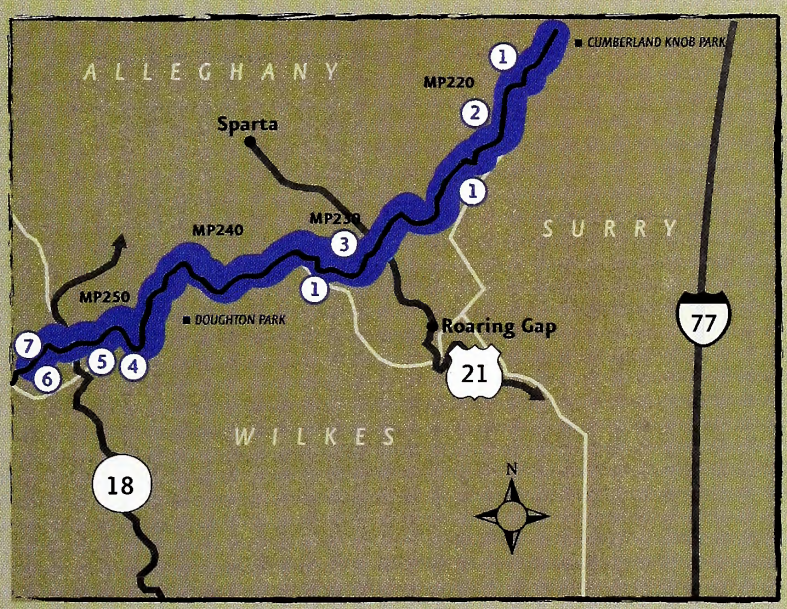
As you move south on the parkway, the road climbs higher. Most of the streams bridged by the parkway are too small to fish close to the road; they require a hike down the mountain to bigger water. In places, some fishermen leave a vehicle on a road at a much lower elevation, then park on the parkway and fish down.

Regulations vary from stream to stream, from hatchery-supported waters with a daily limit of seven fish and no size or bait restrictions to wild trout waters with a four-fish daily limit and a 7-inch size minimum to "special waters" that require catch-and-release and require single-hook artificial lures or flies.

Hatchery-supported water is what most fishermen first run into when they enter the parkway via N.C. 89 at Lowgap along the Surry-Alleghany line. Brush and Big Pine creeks run on parkway property for 7 or 8 miles, almost to the junction of U.S. 21. There, Little Glade Branch, a tiny wild trout stream, flows out of Little Glade Mill Pond and crosses the parkway around Milepost 230. It's a narrow stream for sure, but it was part of a stream restoration project undertaken by the commission in the 1990s.

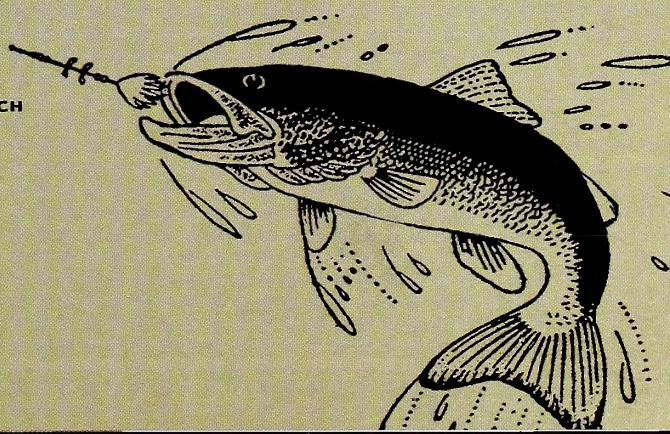
The next good trout waters are Basin and Cove creeks, the headwaters of which are on the Doughton Park property around Milepost 244. A trail leads from the parkway into the Basin Cove drainage. Commission biologist Kin Hodges said, "Basin is a great stream—depending on how far you want to go." It's full of wild rainbows, but climbing from pool to pool can be tough at times. Basin and Cove offer fishermen an opportunity to park one vehicle at the bottom of the mountain on Longbottom Road and another on parkway property for a daylong trek.

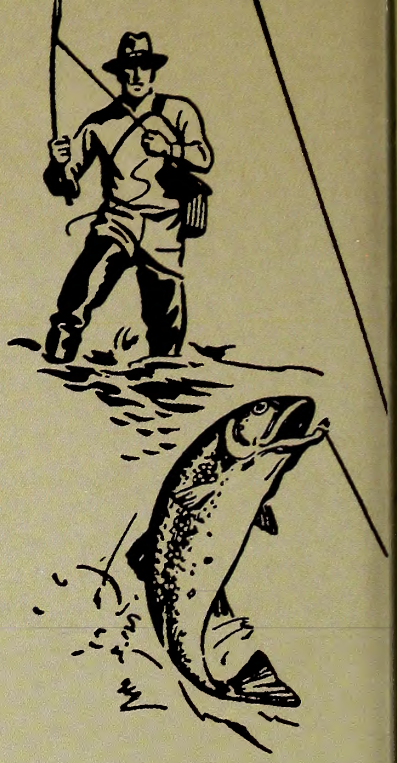
Meadow Fork and Cranberry Creek are both accessible from parkway property around the junction with N.C. 18 at the Alleghany-Ashe county line near Milepost 250. Both are hatchery-supported streams. Hodges said that Meadow Fork "is a decent stream, with a good bit of its length on the parkway. We did a creel survey four or five

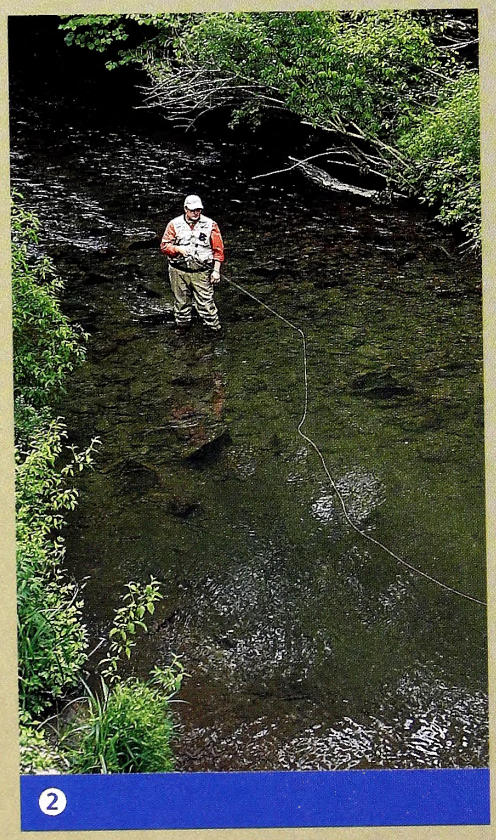


Northern Section — Blue Ridge Parkway

1. BIG PINE CREEK
2. BRUSH CREEK
3. LITTLE GLADE BRANCH
4. BASIN CREEK
5. COVE CREEK
6. MEADOW CREEK
7. CRANBERRY CREEK







years ago, and we found a few wild browns in addition to the hatchery fish. They were healthy fish.

"Cranberry is the stream where the folks you talk to up here go when they want to fish a hatchery-supported stream," Hodges said. "People will swear that it holds more fish, but we stock it at the same level as the others. It's a little bigger, so you can get in there with a fly rod without having to go through bushes on your hands and knees."

CENTRAL SECTION

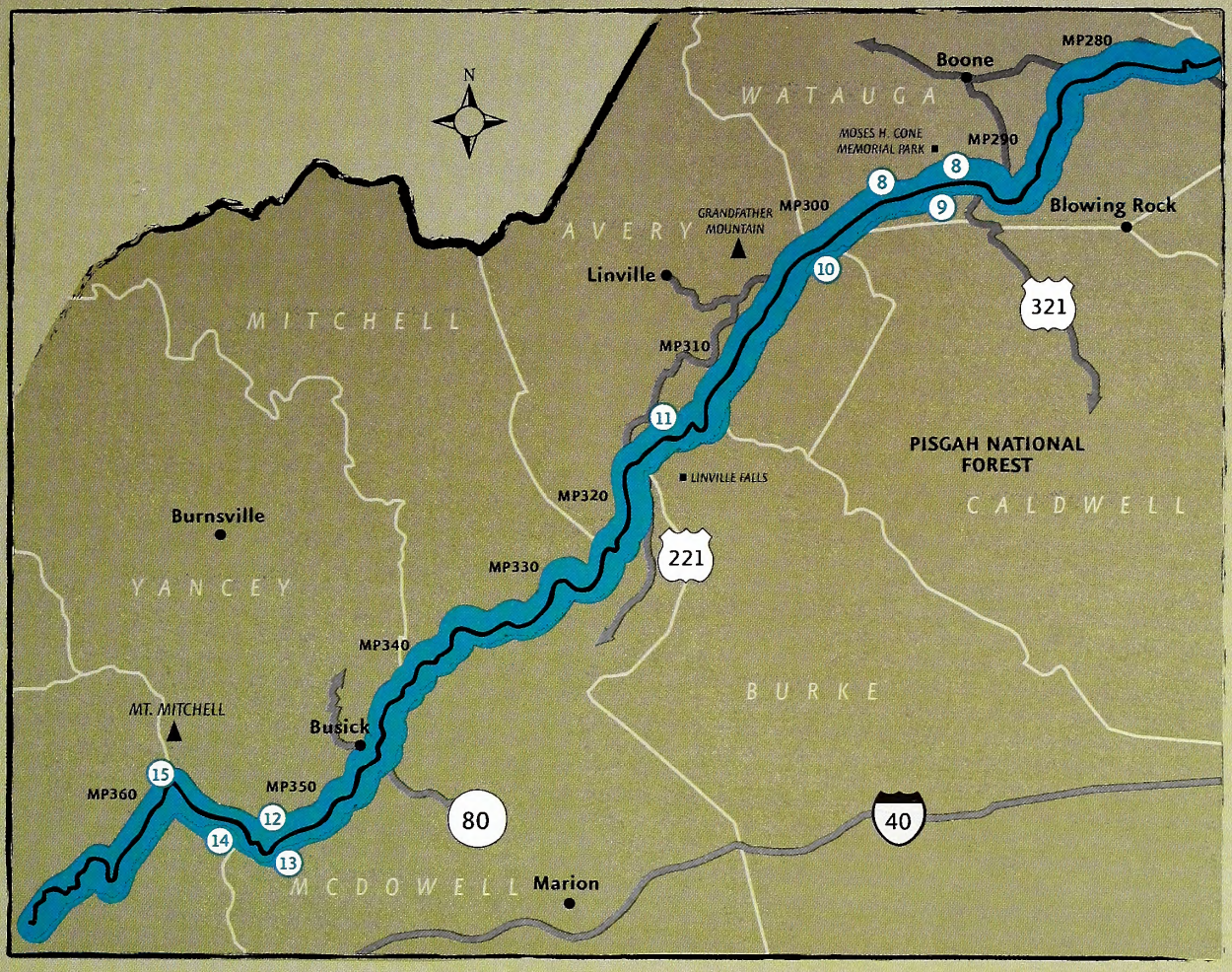
In Watauga County, the center of parkway trout fishing is the area around Moses Cone Memorial Park and Julian Price Memorial Park, between Mileposts 292 and 298. Tiny Sims Creek, Sims Pond and the Boone Fork of the Watauga River are around Milepost 296. "The Boone Fork is managed as wild trout waters upstream of the lake on the parkway," Hodges said. "Downstream from Price Lake, it's catch-and-release only now. The catch-and-release section used to go all the way to the Watauga River, but some private landowners closed that end, and now it's just catch-and-release on the parkway."

Wilson Creek is one of North Carolina's more renowned trout streams. Its headwaters rise along the parkway on the eastern slopes of Grandfather Mountain around Milepost 302. Wilson Creek and a number of its smaller tributaries actually cross the parkway, but commission biologist Bob Brown said, "The parkway is so high up that where they cross, they're small. You've got to park and hike down to do any good."

The parkway's next offering is also one of its most famous: the Linville River. Through much of Avery County, the parkway courses through the mountains east of the continental divide, so its streams flow east, eventually to the Atlantic Ocean. The Linville, around Milepost 316, is one such stream, rolling down the mountains through Linville Gorge before flattening out and pouring into Lake James. "The Linville is a bigger stream; it's hatchery supported, and there's a lot of access, a picnic area and all," Brown said. "It's a relatively big stream, 75 feet wide in some areas, and some places even wider, and we stock it pretty heavily."

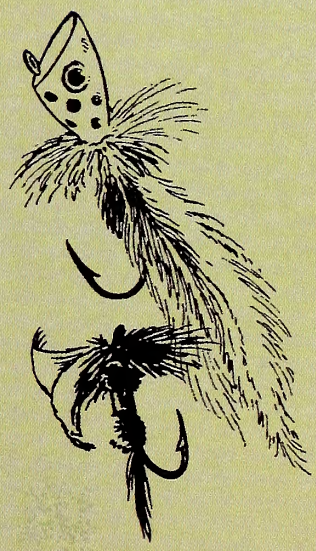
After the Linville, however, there's very little fishing available until you reach Milepost 349 and Mount Mitchell, the highest point east of the Mississippi River. The headwaters of the South Toe River are around the parkway's junction with N.C. 128 (the road that leads up to Mount Mitchell), including Big Lost Cove Creek, Upper Creek and the South Toe. The best access to the streams, according to Brown, is from U.S. Forest Service roads that branch off the parkway and head down the ridge into Yancey County. "It's all wild trout through there, brookies on the upper end and rainbows and browns further down," Brown said. "Some of those streams are fished heavily, but it's not like people are standing shoulder to shoulder."

Commission biologist Scott Loftis of Waynesville said that on the western side of Mount Mitchell there is at least one stream before the parkway reaches Asheville that's worth hiking in to fish: Carter Creek. Its headwaters are on parkway boundaries around Milepost 355. "It's a good little wild brook trout stream," Loftis said. "It's catch-and-release, single-hook artificial lures only, and it has limited access from the bottom. One of the better ways to reach it is from the top, but you may have to walk in an hour to reach fishable water." Of course, if you enjoy solitude and catching wild fish, the walk might be worth it.



Central Section — Blue Ridge Parkway

8 BOONE FORK WATAUGA RIVER
9 SIMS CREEK & SIMS POND
10 WILSON CREEK
11 LINVILLE RIVER
12 SOUTH TOE RIVER
13 BIG LOST COVE CREEK
14 UPPER CREEK
15 CARTER CREEK



Southern Section — Blue Ridge Parkway

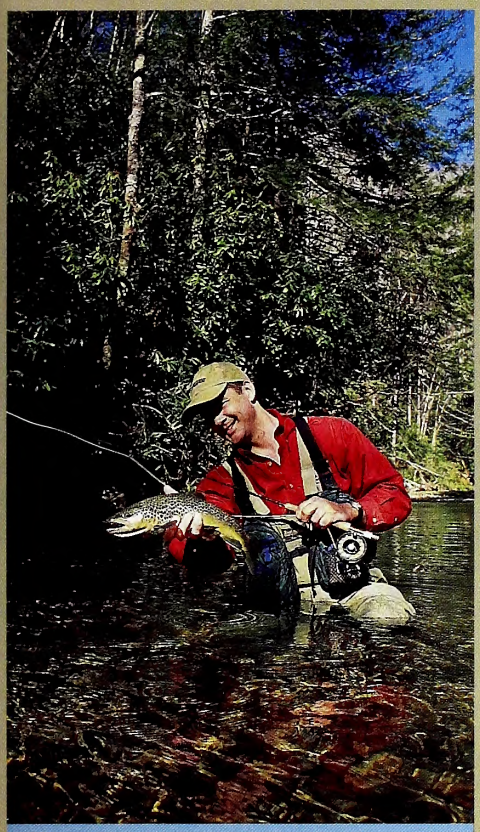
16 LAKE POWHATAN
17 BENT CREEK
18 NORTH FORK MILLS RIVER
19 SOUTH FORK MILLS RIVER
20 LOOKING GLASS CREEK
21 DAVIDSON RIVER
22 NORTH FORK FRENCH BROAD RIVER
23 DARK PRONG
24 YELLOWSTONE PRONG
25 MIDDLE PRONG
26 ROUGH BUTT CREEK
27 PINEY MOUNTAIN CREEK

SOUTHERN SECTION

On the south side of Asheville, the commission manages 6 miles of Bent Creek as hatchery-supported waters, upstream from the N.C. Arboretum around Milepost 393. A section between 4 and 5 miles long starts on the parkway and ends at Lake Powhatan, a 7-acre pond that is stocked by the commission and includes a pier. "I'd categorize Bent Creek as a medium-sized stream," Loftis said. "Lake Powhatan provides a fishing opportunity for people who may not be able to wade a trout stream. There's good access to the pond, plus a pier, and you could drag a canoe from the parking lot to the pond. The arboretum boundary is downstream from the lake maybe a mile."

From Bent Creek south to the end of the parkway, most of the stream access is by hiking down from parkway property, Loftis said. The first major stream that can be reached that way is the North Fork Mills River, between mileposts 400 and 405. "Those are all headwaters streams with wild trout," Loftis said. "Two of the creeks come together to form the Hendersonville water supply impoundment. The headwater streams are managed for wild trout above the impoundment to their source. The North Mills River is designated delayed harvest below the impoundment downstream to the U.S. Forest Service Boundary."

The parkway provides access to streams on both sides of the road for several miles below Mount Pisgah, Loftis said. "The parkway is the boundary between Transylvania and Haywood counties, and on one side, you drop off into the South Fork Mills River headwaters, the Davidson River headwaters, the French Broad headwaters, and on the other side, it's the East Fork and West Fork Pigeon River. It's kind of interesting, because on one side of the parkway you're fishing the Middle Prong of the Pigeon River drainage, and on the other, it may be the French Broad River drainage. The headwaters of the South Fork Mills River are around the Pink Beds area



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19

(Milepost 410.3), then you've got Looking Glass Creek, the Davidson River and the North Fork of the French Broad River."

The Middle Fork of the French Broad originates under Devil's Courthouse (Milepost 422.4), an unusual exposed bare rock summit that's rich in Cherokee legend. "You've got brookies up high and mainly rainbows below," Loftis said. "There are brookies and browns in the Pink Beds area, and brookies in a number of the small tributaries that form the South Fork. As you get down into lower elevations, it's mostly browns. The stream is pretty small on the upper end; there's better access from U.S. 276."

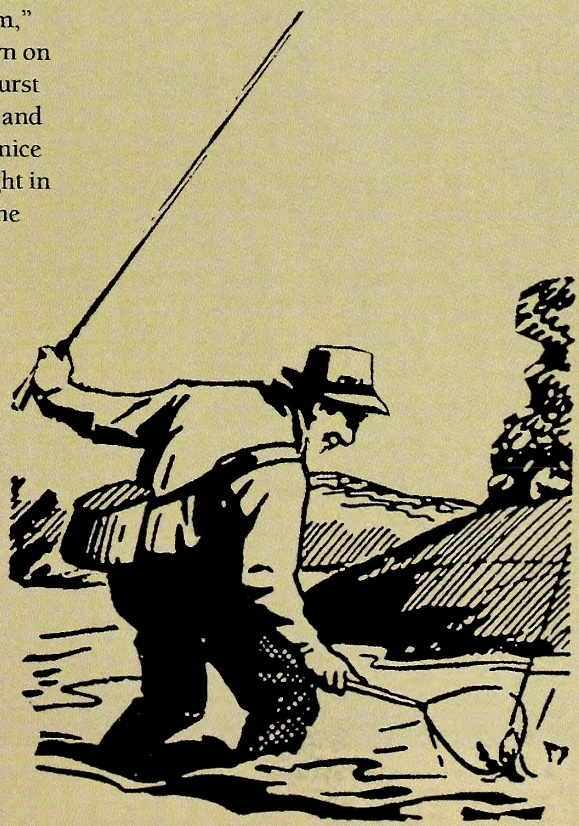
South of Waynesville are some of Loftis' favorite streams on the parkway, the Yellowstone Prong and Dark Prong, which join to become the East Fork of the Pigeon River. He said that the Yellowstone Prong is excellent around the Graveyard Fields area (Milepost 418.8). "You pull off near Graveyard Fields, and about a mile downstream, you've got a series of falls below Graveyard Fields that are called Yellowstone Falls (Milepost 417.9)," he said. "In the Graveyard Fields area, you've got a lower gradient section with a coarse sand bottom and bedrock. It's managed as wild trout waters. Downstream of Graveyard Fields, it gets more rugged, going through a series of falls, then the Dark Prong comes in. Below the confluence of the Yellowstone Prong and Dark Prong, it becomes the East Fork of the Pigeon River. It's a pretty good one-day trip back and forth to the parkway."

The headwaters of the West Fork Pigeon River and Middle Prong are a few miles farther south, around Milepost 424. "The Middle Prong is a nice wild brook trout stream," Loftis said. "People will leave a car down on N.C. 215 toward Canton near the Sunburst Campground, park up on the parkway and work their way downstream. It's a real nice weekend trip; you have to camp overnight in the woods. There are brookies toward the headwaters, and you get into some browns on the lower third. The Middle Prong is wild trout to the confluence with the West Fork."

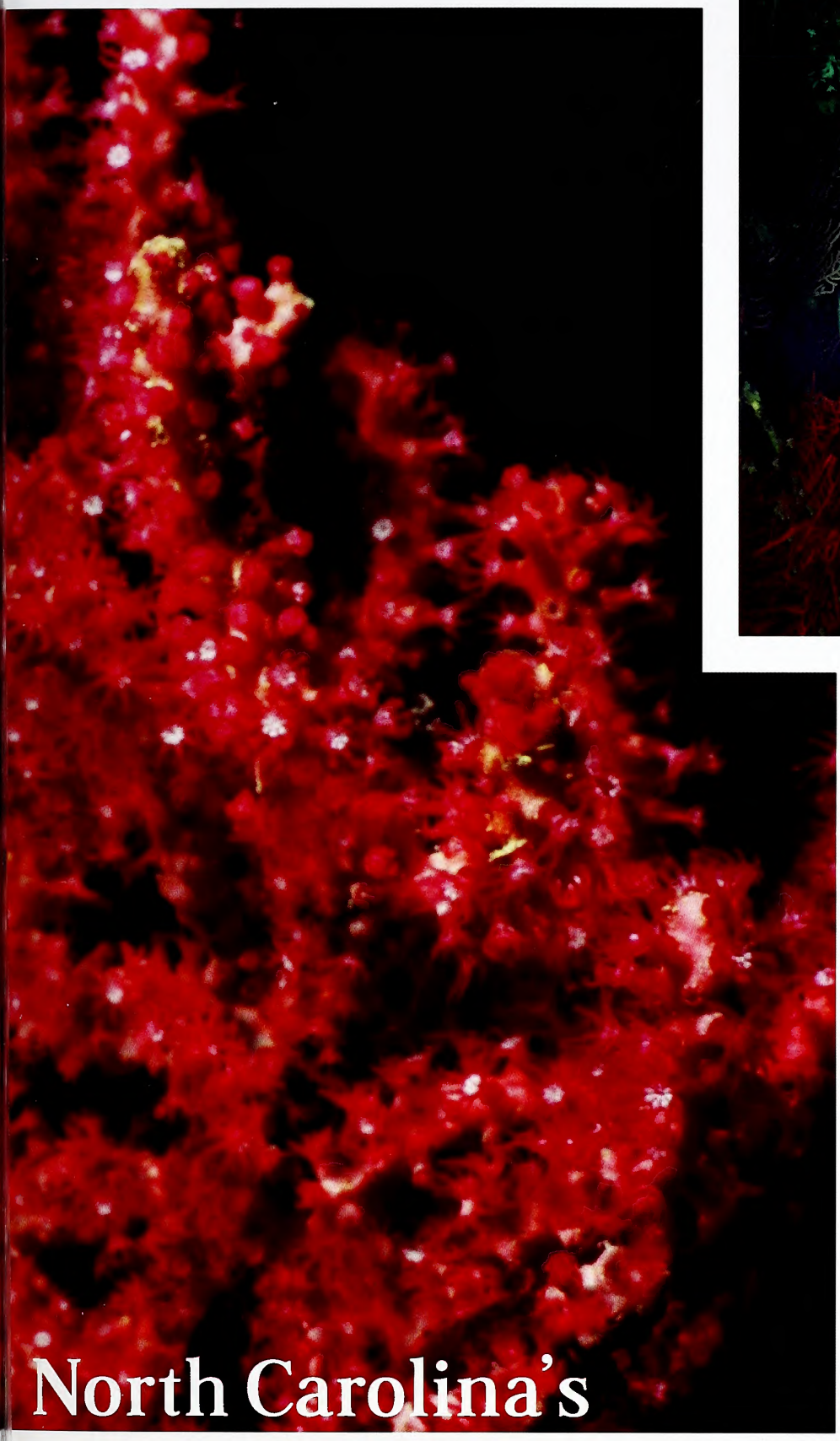
The last major streams along the parkway are along that section of the road that forms the Haywood-Jackson county line. Loftis said that a number of excellent wild trout streams are in the Caney Fork watershed for several miles on either side of Milepost 430. "You've got streams like Laurel Creek, Rough Butt Creek and Piney Mountain Creek, which form Caney Fork," Loftis said. "It's pretty good fly-fishing in there, with brookies in the headwaters and rainbows the farther down you get."

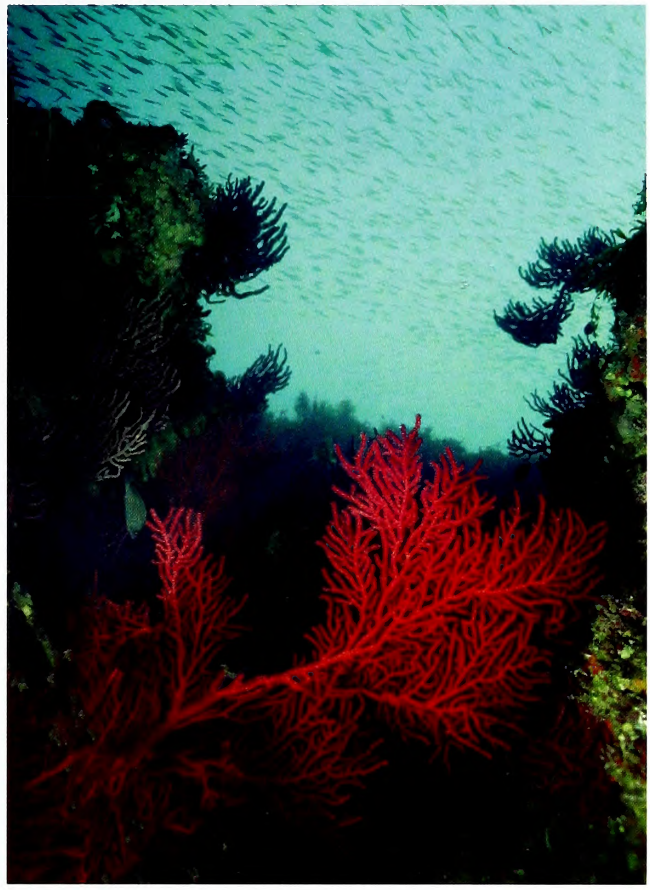
So tie some flies, pack the rods and jump in the car. Angling adventure waits just off the Blue Ridge Parkway. Just make sure your duties are taken care of at home before you go — you might want to stay and fish for a while. ◆

Dan Kibler is the longtime outdoors editor of the Winston-Salem Journal.



A black sea bass eyes the camera of underwater photographer Richard Triebe. At right, a school of fish dashes past a sea fan in an underwater canyon.



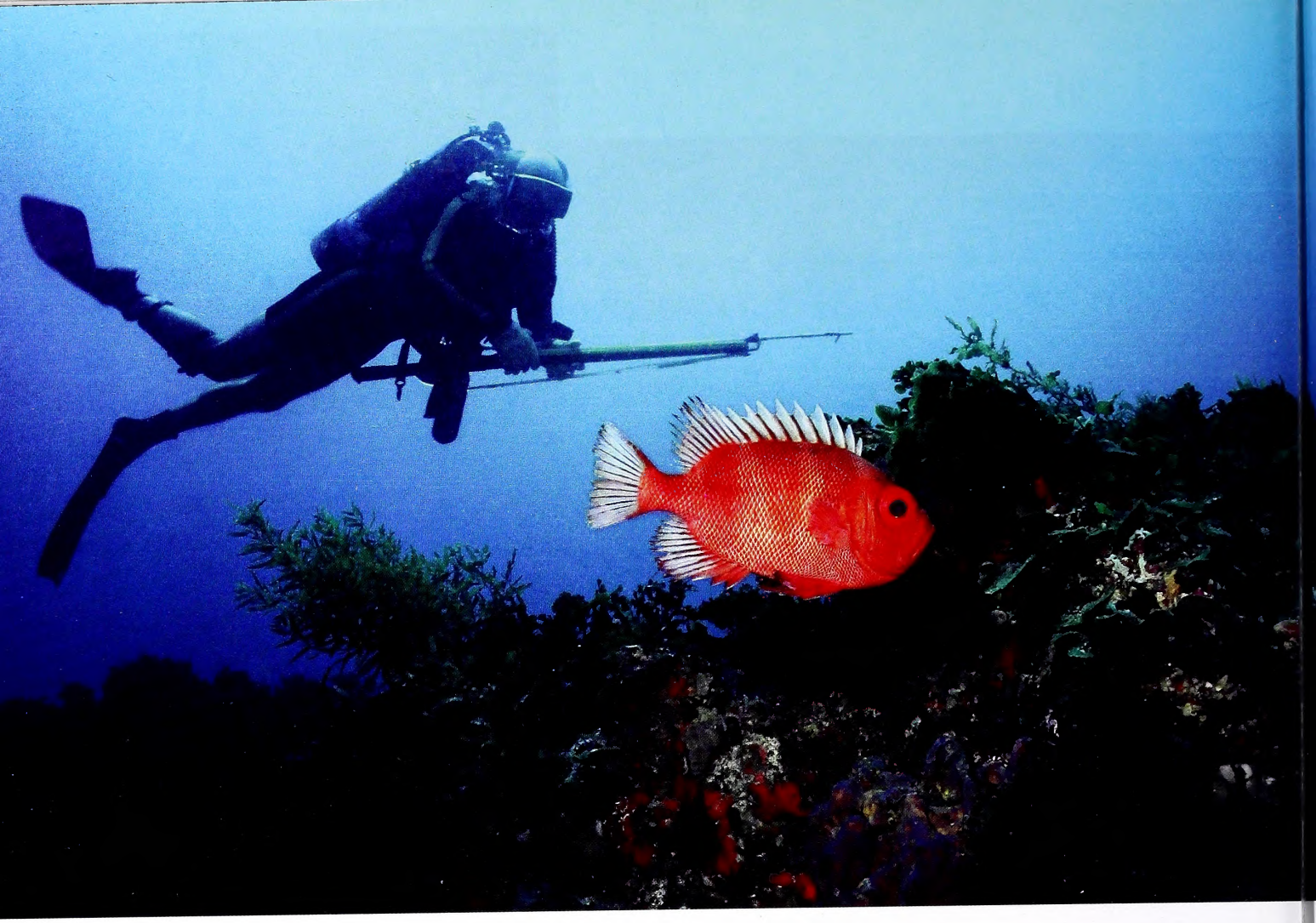


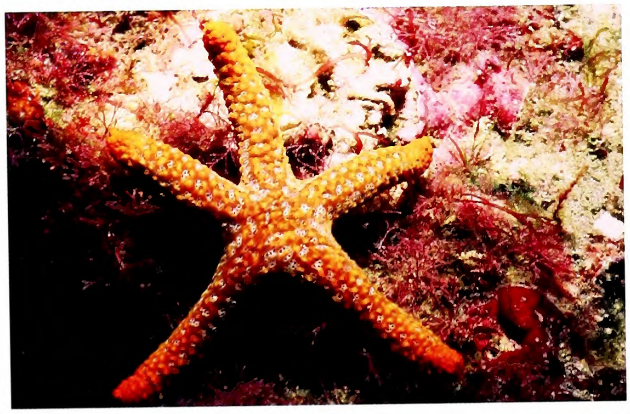
North Carolina's Underwater Wonderland

A different kind of wildlife experience beckons the adventurous to the rocky outcrops of the state's continental shelf.

written and photographed by Richard Triebe

WHENEVER I SHOW MY UNDERWATER PICTURES TO SOMEONE, I USUALLY GET THE SAME RESPONSE: "I NEVER REALIZED IT IS SO COLORFUL OFF THE SOUTHEASTERN NORTH CAROLINA SHORE." MOST PEOPLE ARE ACCUSTOMED TO SEEING ONLY THE DRAB, CLOUDY WATER NEAR THE SURF LINE. THIS VIEW IS MISLEADING, BECAUSE WAVE ACTION AND RUNOFF FROM THE LAND AND RIVERS CUT VISIBILITY DRAMATICALLY IN INSHORE WATERS. THE TRUE UNDERWATER WORLD OF NORTH CAROLINA CAN BEST BE ENJOYED BY GOING OFFSHORE A FEW MILES.





After many years of scuba diving, I have found that both visibility and the diversity of colorful marine life increase the farther I get from the mainland. I take my pictures from 12 to 45 miles offshore. Of course, there is a trade-off. Though I find more fish and beautiful corals out there, the time I can spend on the bottom taking pictures is greatly reduced because of the pressure of deep water. If I did not follow the dive tables carefully and limit my time underwater, I could become paralyzed or suffer a fatal case of nitrogen narcosis. Typically, when I dive to 120 feet, I can spend only eight to 10 minutes on the bottom—not much time for photography. Still, I have been fortunate enough to have taken some wonderful pictures.

My equipment is a Nikonos V 35mm underwater camera paired with an Oceanic 2001 flash unit. A strobe is necessary because water filters more sunlight the deeper you go. I usually use Ektachrome 64 film; I think lower speed film gives me better color saturation. At 33 feet, red is the first color of the light spectrum to fade, followed by orange and yellow. Below 60 feet, the sea bottom

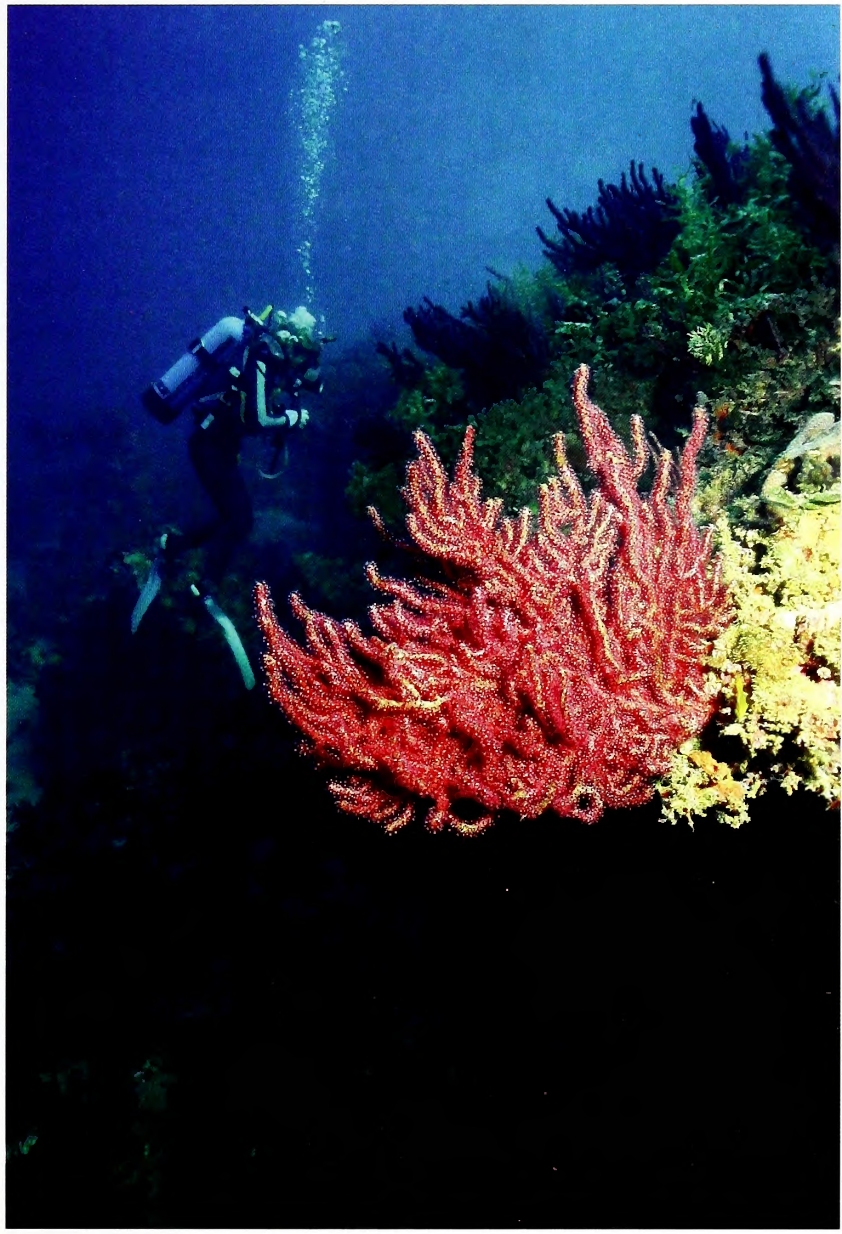
Diver Bill Mansfield examines a foraging bigeye. Twin spotfin butterfly fish were found at a depth of 90 feet; a small starfish, at 70 feet. At right, Julep Gillman-Bryan snaps a picture of a sea fan. Triebe captured the image of a white grunt near the sea floor.

can still be seen easily, but everything is a muted shade of blue. At 100 feet or deeper, objects appear much the same as at 60 feet, but the bottom is darker because more light is filtered out. A strobe light restores the brilliant color that is lost to our eyes. Many times I am unsure of the true color of an object until I get my pictures back.

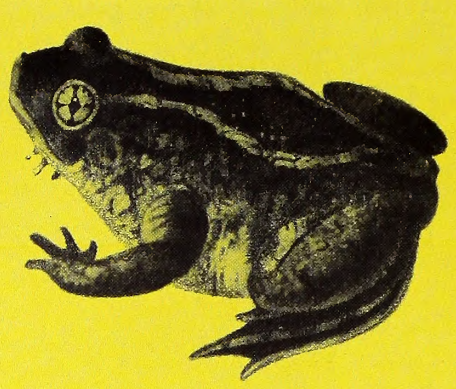
The continental slope off North Carolina's coast has a series of rocky underwater ledges that extend for miles into the ocean. These ledges are old river channels that were flooded when the polar ice cap melted at the end of the last ice age. This hardbottom surface is extremely popular with fishermen and scuba divers because it provides food and shelter to vast schools of fish. The rocky outcroppings are found at different depths and almost resemble a set of stairs. The ledges I visit off southeastern North Carolina are in 40, 60, 80, 100 and 120 feet of water. The Gulf Stream's warm, clear water greatly influences marine life on the farthest ledges. The multitudes of fish, snails and corals that thrive there would seem to be more at home in the Caribbean Sea.

Like the ledges, the many shipwrecks off our coast are loaded with life. Because of ambient sunlight, the closer a wreck is to the surface, the more life it has. All sorts of fish and invertebrates live on a shipwreck. Damselfish, pinfish, striped drum and blue angelfish are found in abundance. The predators who hunt them also live there—I often spot groupers, snappers, barracudas and sharks. I once saw a majestic 10-foot bull shark patrolling the wreck of the *SS John D. Gill*. His presence was so overwhelming that I found myself breathing softly through my regulator so I would not disturb him. On a springtime dive on the *SS Caribsea*, I saw hundreds of sand tiger sharks that were gathered to mate. These sharks were 5 to 8 feet long and swam by as if I did not exist. Some individuals came so close that I could have reached out and touched them. That was the photo opportunity of a lifetime, and unfortunately I had left my camera at home.

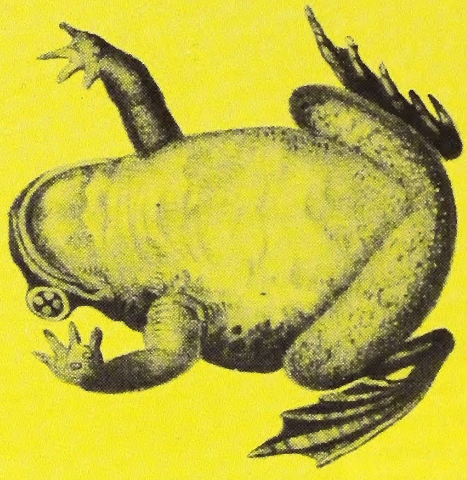
I hope these pictures will show the incredible underwater wonderland available to anyone who dares to put on a wetsuit and venture offshore. A word to those who aim to capture this world on film: Never leave your camera behind!



Richard Triebe has a degree in Marine Technology and has been diving and photographing marine life for 35 years.



THE SINGING HERMIT



Scaphiopus holbrookii

27.

WRITTEN BY DAVID S. LEE

Water ran in sheets across the grass. The spadefoots had found a low spot in the lawn where the long, hard, late-winter rain had formed a large puddle. Male spadefoots came by the hundreds, bobbing on the surface of the temporary pond and singing their unending song: *Naarh . . . Naarh . . . Naarh*! The snarling notes were repeated every two seconds in a chorus of loud, annoying sound.

The expanded white throats of the singing males looked like floating golf balls. The spadefoots inflated and deflated first their vocal sacs, then their bodies. The swelling throat sac changed each male's center of gravity, shifting horizontally floating animals to vertical positions. The swelling, deflating and bobbing amphibians looked like a bunch of strange, battery-operated toys that had somehow escaped from Radio Shack. A few of the males found perches, singing from mounds of grass that broke the surface. Only a few females, each one fat with eggs, were present.

ILLUSTRATION REPRINTED FROM "HOLBROOK'S NORTH AMERICAN HERPETOLOGY," 1976

A close cousin of frogs and toads, the Eastern spadefoot has a myriad of curious adaptations that make it one of North Carolina's most fascinating amphibians.

Lightning flashed and thunder crashed. The collective volume was enough to drown out all other sound and thought. Naturalists frequently use the term "deafening" to describe the chorus of large aggregations of singing, breeding frogs and toads. Although overused, the word suggests how loud a breeding congregation can be.

In March 1988 I experienced one of the loudest amphibian choruses I have ever heard. It lasted for two nights, starting each evening and continuing throughout the night. The singers were all Eastern spadefoots, members of a small, squat, toadlike amphibian species. The Bladen County breeding site was my in-laws' backyard. No one actually went deaf, but everyone's nerves were worn thin by the experience. The squawking voices of the males sounded like cawing crows on hormone treatments. The penetrating noise produced by spadefoots can be heard up to 1¼ miles away, but these were all calling from within 30 yards of my relatives' house. The voice of the male carries well because the throat sac, which swells to three times the size of the creature's head, acts as a resonator (See Nature's Ways, page 39). In contrast, the female is fairly quiet and can emit only low, grunting sounds.

Individuals and attached pairs disturbed by my flashlight dove to the bottom of the 8-inch-deep pool. The water was clear, and I could see the 2- to 3-inch-long amphibians swimming or attempting to hide on the bottom. A few paid no attention to my light, even when I shone it on them, and kept on singing. Those off in the darkness, of course, never let up.

Curious to see their reaction, I stood there in my wet, cold tennis shoes, screaming as loud as I could. Neither the spadefoots nor my in-laws heard me. My screaming was about as noticeable as a lone flute at a rock concert. Everyone who hears a full chorus of spadefoots tries to describe it. Natural history writing is filled with descriptions such as "weird, plaintive cries," "the squawk of some animal severely injured" and "hoarse and woeful." These descriptions are inadequate. A spadefoot chorus is one of the astonishing aspects of nature that must be experienced firsthand. And you will get wet.

From torrent to tadpole

The Eastern spadefoot (*Scaphiopus holbrookii*) lays its eggs in flooded areas produced by torrential downpours. Unlike frogs and toads that use ponds, marshes and roadside ditches for breeding, the spadefoot breeds in ephemeral pools, flooded fields and extensive, but temporary, puddles. Often its breeding activities are completed within 24 hours of a storm. Unlike other species, it does not have a defined breeding season. One year it may breed in March, and the next year well into the fall. In some years it may breed more than once, but in most years it does not breed at all. However, the adult remains in physiological readiness for breeding much of the year and may launch into a breeding frenzy when conditions are right.

Although the trigger of this explosion of mass breeding is not well understood, it is likely the result of a sudden drop in barometric pressure. A friend of mine once placed captive spadefoots in a bell jar and pumped out some of the air, lowering the pressure inside the jar. Animals that had expressed no interest in breeding during months of captivity immediately went into amplexus, the copulatory embrace during which the male fertilizes eggs released by the female.

Males arrive at the breeding pools before the females and immediately begin their mating calls, sometimes even during the day. Males may visit different pools before selecting one from which to sing. They ignore passing females, grasping one only after she touches him. Unlike most other North American frogs and toads, which hold the female just behind her front legs, a spadefoot male grasps a female with his front legs around her midsection. Biologists consider this a primitive amplexus posture, but it gives the pair better swimming mobility, and the male can use his hind legs

MARK TEGGES

R.W. VAN DEVENDER

TODD PUSSER

MARK TEGGES

Ephemeral pools formed by downpours can spark breeding. Mating is characterized by the amplexus posture, in which the male grasps the female around her midsection. Spadefoot tadpoles develop extremely quickly, from two weeks to two months, before they metamorphose.

to kick rival males. Specialized pads on the toes aid the male in maintaining a tight clasp on the female. Once the male acquires a mate, he stops vocalizing. Like those of typical frogs and toads, spadefoot eggs are fertilized externally as the female lays them. By morning the adults have disappeared, and they may not reappear at that site for many years.

Spadefoot eggs are deposited in gelatinous strings. Females wind egg strings around grass and other submerged vegetation at the bottom of temporary pools. One female can produce up to 2,500 eggs, and each egg appears as a single dark spot inside the string. After the egg mass is deposited, she leaves the breeding pond, but the male remains through the night, singing and hoping to encounter more females.

Breeding in a temporary pool has two advantages. First, the spadefoot can live in places far from permanent bodies of water. More important, temporary pools do not have predators such as fish, dragonfly larvae, giant waterbugs and competitive larvae of other amphibians. The down side is that the tadpoles must develop quickly into adults to escape from the pools before the water dries up. The temporary habitat also offers little food for the growing mass of velvety black tadpoles. Most breedings are unsuccessful because the pools dry up, leaving an entire crop of tadpoles to perish. If nutrients in the pool are scarce, tadpoles begin dying, and the survivors may cannibalize the dead.

Spadefoot tadpoles have a strategy that can hasten their development, helping them win the race against the shrinking temporary pool. As they swim about in dense schools, the action creates whirlpools that suck up and concentrate plankton and organic material from the bottom of the pool. The concentrated food is inhaled by the tadpoles and filtered through their internal gills. As soon as they transform into adults, they leave the breeding pool, many of them still retaining portions of their tadpole tails. The young are no more than half an inch long when they metamorphose and emerge from the pool.

> IT IS THE SPADEFOOT'S SUBTLE ANATOMICAL DIFFERENCES THAT MAKE IT OF GREAT INTEREST TO SCIENTISTS WHO STUDY EVOLUTION.

When pool waters are warm, Eastern spadefoot eggs can hatch in one day, but in cooler weather, eggs may take a week to hatch. The tadpole stage lasts from 14 to 60 days, depending on condition of the breeding pool and availability of food. This is an extremely brief period for embryonic development and completion of the tadpole stage. Bullfrogs, for example, spend 14 to 16 months as tadpoles, and some remain in this stage for up to three years.

TODD PUSSER

Two of the spadefoot's trademark physical characteristics are vertically slit, catlike eyes, and feet that feature "spades" made of scalelike skin.

≈ WHO YOU CALLING "TOAD"? ≈

The spadefoot is often mistaken for a toad. Although most field guides and references call this amphibian a spadefoot toad, "toad" is a little misleading and masks how different these unusual creatures are from your garden-variety toad. From an evolutionary perspective, spadefoots are an intermediate group between primitive types and modern frogs. The spadefoot has its own suborder, Mesobatrachia, and family, Scaphiopodidae. Other frogs and toads in the Southeast are classified in more advanced groups such as true toads, true frogs and treefrogs.

Confusion arises because creatures in different taxonomic orders are often as different looking as ducks and woodpeckers. However, because of the physical similarities among the world's 2,600-plus species of hopping, tailless amphibians, many people would be comfortable thinking that all of them are either frogs or toads. It is the spadefoot's subtle anatomical differences that make it of great interest to scientists who study evolution.

The spadefoot resembles a true toad in build, but it is distinguished by its moist, less warty, much smoother skin and by the broad, sharp-edged spade on the inner side of its hind feet. The "spade" is a highly cornified area that is made of scale-like skin. Another less-than-obvious difference is that the spadefoot has teeth in its upper jaws like frogs do. Toads are toothless.

And then there is the eye. The spadefoot has a vertical, catlike pupil set off by a golden iris. Generally, nocturnal species have vertically slit pupils, and diurnal species have round ones. Slitlike openings work more efficiently than circular openings and offer better protection to retinas that are adapted for low light levels. The eyes of geckos, skimmers, alligators, some snakes and a number of other creatures share this same basic design.

DAVID LEE

The spadefoot has webbed feet, a strange arrangement for a nonaquatic species. Apparently, webbing helps the spadefoot take full advantage of temporary pools during its brief breeding bouts. The namesake characteristic of this creature is actually a highly functional structure. Toads and frogs hop away to escape, but the spadefoot just squats and rocks back and forth, quietly and quickly disappearing below the surface of the ground. Hold one in your hand, and you can feel the digging motion of the hind legs and the sharp spades.

This amphibian digs sloping burrows that descend a foot or more below the surface.

DAVID LEE

MARK TEGGES

DAVID LEE

Skin secretions bind the sandy soil, creating a tubelike burrow that frequently needs repair but does not often collapse. A gravedigger once found a spadefoot more than 3 feet down; one of the western North American species was reported at 15 feet deep.

The spadefoot remains in its burrow for days, weeks or sometimes months, digging deeper during periods of drought. Often these amphibians are forced to remain in relatively dry soil for extremely long periods. When the spadefoot is at rest, the loose skin on the upper front leg extends as a fold over the lower front leg and front foot, and the head is bent downward with the chin resting on the front legs. All four feet are tucked under the creature in a cozy position that reduces exposed surface area and helps limit dehydration.

The spadefoot has a few tricks that allow it to survive in dry, sandy soils and, in some cases, through long droughts. During extremely dry periods, the spadefoot excretes a fluid that hardens around it like a cocoon. It remains dormant in its self-made protective chamber, trapping whatever moisture is available. Even its metabolism works in its favor — amphibians have the lowest metabolic rate of any group of vertebrates. Their large, bulky red blood cells carry and distribute more oxygen, allowing amphibian body processes to function in slow-motion.

> TOADS AND FROGS HOP AWAY TO ESCAPE, BUT THE SPADEFOOT JUST SQUATS AND ROCKS BACK AND FORTH, QUIETLY AND QUICKLY DISAPPEARING BELOW THE SURFACE OF THE GROUND.

MOSTLY MONASTIC EXISTENCE

Soil type is critical to a burrower, and the Eastern spadefoot is found only in certain areas within its overall range. The wide band of alluvial soils associated with the Mississippi River and its tributaries separates the Eastern populations from those occurring west of the river. Likewise, within the Piedmont and Coastal Plain of North Carolina, the spadefoot is absent from large areas where soil types are inhospitable for burrowing.

For most of the year, the spadefoot maintains a territory as small as 70 to 100 square feet. During nonbreeding periods it is a secretive animal, coming to the surface on rainy nights to sit at the mouth of its burrow to wait for passing insects, spiders and other prey.

The spadefoot may go years, and possibly decades, without breeding. The ones I watched in my in-laws' yard have not reappeared. I occasionally see spadefoots on my own Bladen County property, but in 15 years I have neither heard a breeding chorus nor seen their whirling schools of tadpoles.

Adults show up in strange places where no one ever recalls hearing their breeding aggregations. Rural people in tune with nature used to call spadefoots "storm frogs" because they gathered only during big storms or floods. Even the hurricanes that pounded the Southeast in the last two years failed to get them breeding on my North Carolina property, but a friend in central Florida called to tell me that, after a decade of looking, he finally found them near his house. They were calling by the hundreds

TODD PUSSER

Far left: The spadefoot conceals itself in a burrow dug in sandy soil. Top middle: An upside-down spadefoot shows the species' ability to tuck tightly. This adaptation enables it to stay burrowed for long periods and survive a loss of 60 percent of its body water. Immediate left: The darker-colored spadefoot has moister, less warty skin than the Southern toad next to it. Above: A full-grown adult spadefoot is still diminutive, reaching a maximum length of 3 inches.

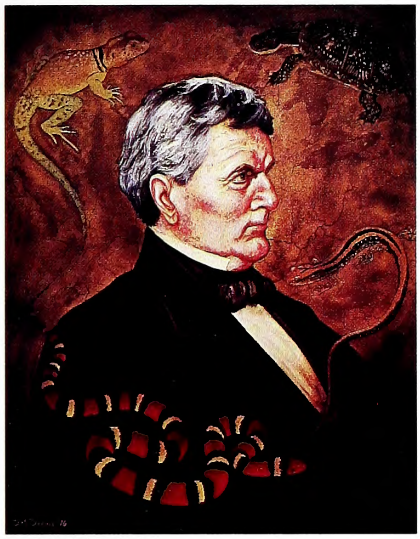
just after Hurricane Frances passed. Now that is selective breeding.

As a burrowing creature that is protectively colored, nocturnal and not seasonally predictable, the spadefoot remains unnoticed by most people. Its habits also make it difficult to see. Toads emerge to feed at dusk, but the spadefoot does not appear until later in the night, and then only on wet nights—times when people generally are not outside. Unlike toads, which hop about, the spadefoot typically remains concealed in the entrance of its burrow. You could have a sizeable population in your back yard and never know it.

But one night when the conditions are right, spadefoots could announce their presence with a relentless, loud, squawking chorus. It is worth putting on boots and a raincoat and going out to take a look for yourself. With a cellular phone, you can enjoy sharing the spadefoot's song with a friend at almost any hour of the night. Better yet: Can you recall anyone you found to be highly annoying recently? And do you have their phone number? ⬘

Frequent contributor David S. Lee is director of the Tortoise Reserve, an international turtle conservation organization.

~ Dr. Spadefoot ~



PORTRAIT BY DAVID M. DENNIS

The spadefoot and many of the other 82 species in the families Pelobatidae and Scaphiopodidae are sometimes referred to as hermit frogs. These families occur in Europe, northwestern Africa, southern Asia and North America. The Eastern spadefoot (Scaphiopus holbrookii) *is the only species to occur in the eastern United States. The genus name is derived from the Greek "scaph" meaning something dug out. "Scaphion" is a noun for "spade," and it is combined with "pus," for "foot." Thus, the scientific name is like the common English name, spadefoot.*

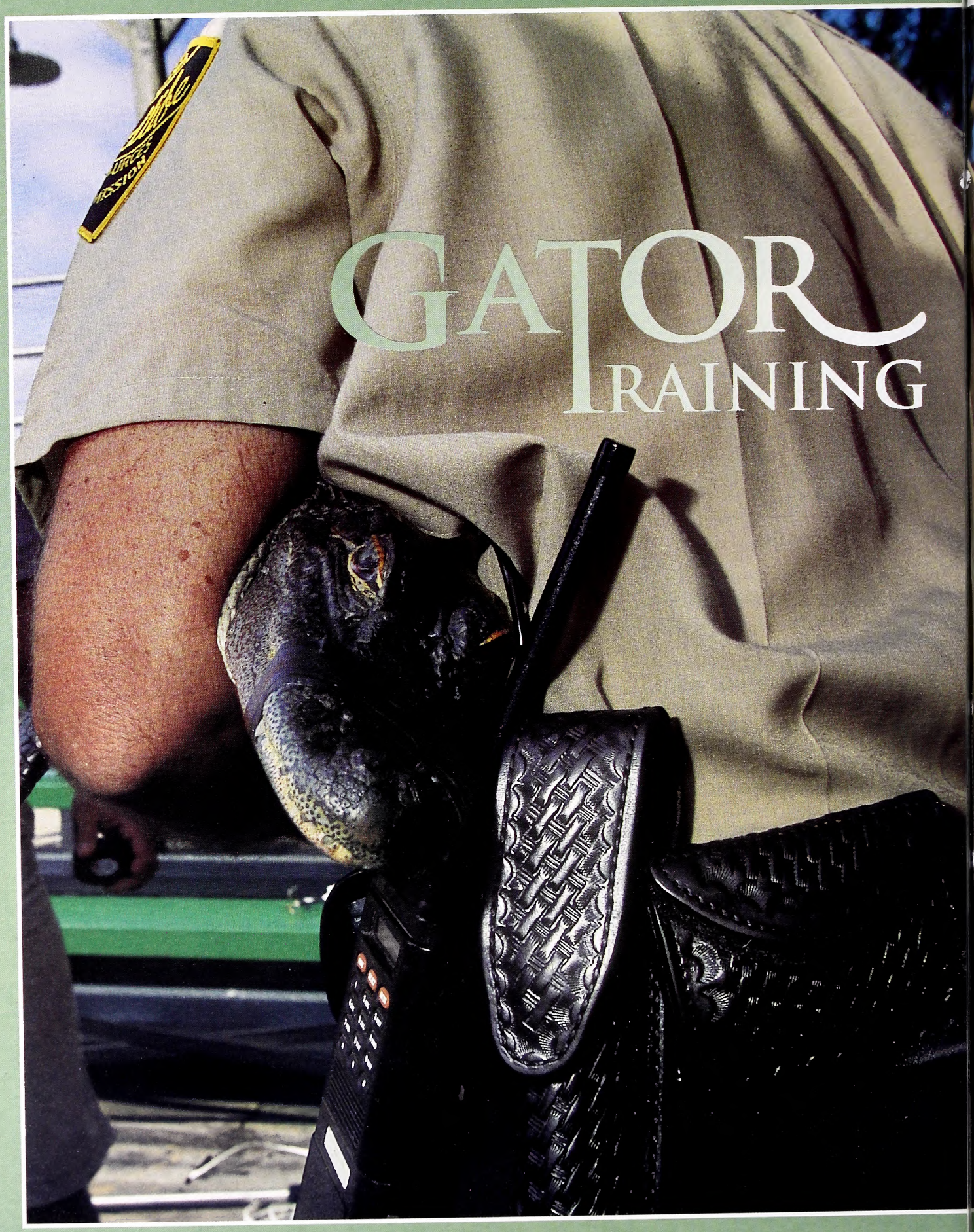
The species was discovered in 1835 and named after Dr. J.E. Holbrook, honoring his contributions to the study of American reptiles and amphibians. Holbrook (1794–1871) was a Charleston, S.C., physician as well as an accomplished herpetologist. His multivolume monographs "North American Herpetology" and "American Herpetology" were the first in their field, and both were illustrated with numerous color plates. The Civil War became the ruin of Holbrook's career. After serving in the Confederate army as a medical officer, he lost all of his specimen collections and his extensive library in the aftermath of the war.

Predators and biologists beware

When handling the spadefoot, people often experience nasal discharge, sneezing and watering eyes. These allergic reactions result from secretions from the skin glands of spadefoots. The secretions also provide a foul taste to predators, which quickly learn to avoid the spadefoot.

Years back, I gently touched the soft skin of a spadefoot with a wet finger and put it to my mouth. My learning curve was abrupt—the taste was nasty. As best I can tell, the chemical nature of spadefoot secretions has never been determined.

In contrast, true toads discourage potential predators with a milky toxin secreted by enlarged and specialized glands on the back of the head. Many amphibians produce toxins from special skin glands. Most are not potent, but a few are quite poisonous, and some are deadly.


GATOR
TRAINING

WILDLIFE ENFORCEMENT OFFICERS GET A LESSON IN HOW—AND HOW NOT—TO HANDLE AN ALLIGATOR.

This one's not done fighting. All 3½ feet of young alligator squirms to loosen the cord around its neck. Just a few moments ago, life was as good as it gets when you're cold-blooded. Sunning in its pool on an unseasonably warm fall day, the alligator suddenly feels a noose tighten as its body is yanked upward. Plopped onto a wooden floor, it begins rolling like a log—an alligator's favorite defensive trick. For more than a minute, its knobby green back and smooth yellow belly alternate like a strobe as it spins to free itself. But freedom isn't to be had, and the exertion has exhausted it.

WRITTEN BY BRAD DEEN
PHOTOGRAPHED BY JODY DUGGINS

Alligators are normally shy animals and prefer to stay away from humans.

"THE AREA DOWN HERE, 15 TO 20 YEARS AGO, WAS PRIME ALLIGATOR HABITAT," SMITH EXPLAINS. "NOW THERE ARE GOLF COURSES, HOUSES, SUBDIVISIONS."

A pair of shiny black boots takes position behind the alligator's front legs—a "safe zone" where its crushing jaws and razor-edged teeth can't reach. Now it feels something tight wrapping around its jaws.

"Good, good," encourages Ken Alfieri, an expert in all things alligator, especially how to handle them. "Now, bring him up to you." Wildlife Officer Toby Hall complies, grasping and lifting in as close to one motion as he can, considering that the alligator, suddenly fearful again, is thrashing its whiplike tail. "Don't worry about his tail. The tail can't hurt you," Alfieri calls. "Just secure him. Right up to you."

Officer Hall, blond with a football lineman's build, pulls the gator's side against his own torso. Then he tucks its head under his powerful left arm, its tail under his right.

"Now," Alfieri barks to a dozen more uniformed wildlife officers watching from the bleachers, "you'll see him stop struggling. He knows you've got him. Fighting hasn't worked, so it's going to relax, regain its strength and look for another opportunity to get free. Of course, sometimes it'll . . ."

As if on cue, the alligator urinates. It stains Officer Hall's dry-clean-only green pants. The strongly acrid scent quickly reaches the bleachers, where the wildlife officers roar with laughter. Officer Hall can only wince, then laugh along.

Alfieri laughs, too, but his eyes are serious. He raises his left hand, missing its middle fingertip. "Just hope that's the worst thing that happens when you're handling an alligator."

THE PEOPLE INVASION

"We really needed this type of training," said Wildlife Lt. Danny Smith. Each year, officers under his supervision in Brunswick and surrounding counties handle 30 to 40 nuisance alligator calls. Long ago, they got hardly any calls. The alligator population didn't balloon overnight, but the human population did.

"The area down here, 15 to 20 years ago, was prime alligator habitat," Smith explains. "Now there are golf courses, houses, subdivisions. We get calls from people who live on sites near lakes or low-lying areas, and they have an alligator under the dock or in their pool. We had four calls this year alone where people walked into their garage, and there's an alligator in there under the car."

North Carolinians rarely have anything to fear from alligators. Although some live near the northeastern coast, that would be close to the northern end of their range. Most Tar Heel gators are concentrated along the southeastern coast and swamps.

Sarah Cross, herpetologist for the N.C. Wildlife Resources Commission, said alligator attacks on humans are rare. "Frequently, it's because someone has been feeding one," Cross said. "Alligators have tiny brains. When they associate food with people, that's when you have problems."

Alligators are actually shy, she said. They prefer to keep a cautious distance from humans. But when people or pets intrude into an alligator's established territory, the alligator can interpret that as a threat.

The Wildlife Commission typically doesn't handle nuisance animal calls. That's usually the job of a local animal welfare agency or private wildlife damage control agents, who are licensed by the Wildlife Commission. But in emergencies, state wildlife personnel respond.

"If the alligator poses an immediate threat to human safety or there's a threat to the animal itself—say, it's in a parking lot where it might get run over or bite somebody—in that situation, either an officer or one of the commission's biologists will handle it," said Col. Kenneth Everhart, chief of the commission's Enforcement Division. "Other than that, we'll refer them to an appropriate individual or agency."

Although Wildlife Commission policy is clear about when to respond, less clear has been what to do at the scene. "It turns out we weren't doing it the right way," said Smith. "We're lucky we haven't had any serious injuries to our officers."

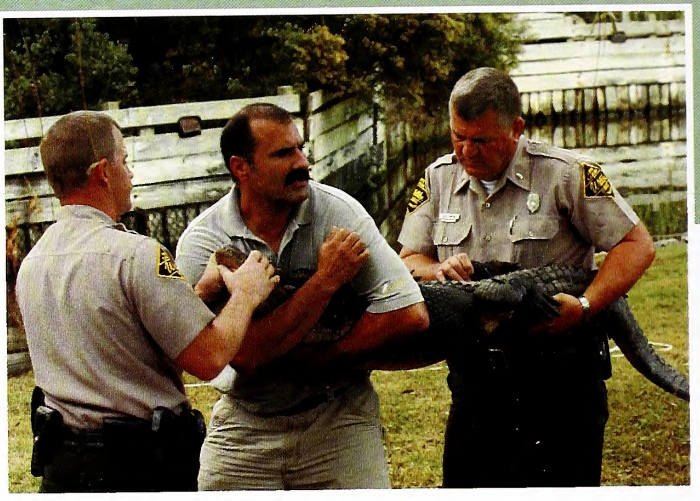
Although the Wildlife Commission's enforcement officers do not routinely handle nuisance alligator complaints, they learn how to handle gators in emergencies.

Smith himself was bitten a few years ago while releasing an alligator he had captured and transported to a remote swamp. "He nipped my finger. I'd made him about as mad as you can. I caught him and tied him up, put him in the back of a vehicle, and drove 30 minutes to an hour. He had time to rest, sulk and get madder. He wanted to attack more than retreat. That's their first instinct, to retreat from humans. But he'd already figured out retreat doesn't work. He'd already tried it and got captured. So when I went to turn him loose, he nipped my finger."

While neither the first nor the worst alligator bite Smith has sustained—an 8-inch hatchling put him in the hospital for a week with a bacterial infection—the incident made him think about the need for specialized training in handling alligators. So he approached an old acquaintance from Bladen County who had both the interest and resources to help.

TAR HEEL CONNECTIONS

Sammy Puglia and family preside over a real estate empire in Myrtle Beach, S.C. Two jewels in the crown are Barefoot Landing housing and golf development and the House of Blues nightclub. Nestled beside its glittering sister attractions is Alligator Adventure, a family-centered animal park along U.S. 17. It is filled with native and exotic wildlife, from otters



Zoological curator Ken Alfieri (above, center) demonstrates the proper technique for handling an alligator. Even small alligators can inflict a nasty bite and must be treated with the same caution as a larger animal. Alfieri trains enforcement officers to ignore the tail, secure the head, then wrap the jaws with electrical tape.

to tropical birds. And as the name implies, there are alligators, more than 1,000 of them.

"We're fortunate to have the business we have," said Jake Puglia, who founded and runs Alligator Adventure. "It's an opportunity for us to give something back."

Jake Puglia described himself as "homegrown North Carolinian," with deep family roots in Bladen County. He still enjoys returning there to hunt. In fact, that's how his father met Smith nearly 20 years ago. The elder Puglia was taking a hunter safety course that Smith taught. Over the years, they saw one another infrequently, usually whenever Puglia managed to get away from his growing business to go hunting. Through his father, Jake Puglia met Smith.

"Danny sold my father a lifetime hunting license for me when I was 15," Jake said. So when Smith inquired about training in proper alligator-handling techniques, Puglia agreed to help. "There are so many ways to catch an animal, so I couldn't say this is the only way to do it," Puglia added, "but I told him we'd show him what works for us."

Alfieri, the zoological curator for Alligator Adventure, holds up a roll of black electrical tape. He reels off a few inches, then squats to secure the jaws of the 8-footer he's astride. "What you're going to do with these medium-sized guys is a lot like what you did with the smaller ones," he tells the assembled officers as he wraps the black tape.

Electrical tape works best for the jaws, he explains. Not because it's stronger or stickier than anything else, such as duct tape. It's not, but that's actually why it's more useful. An alligator's jaws are capable of tremendous crushing and clamping force, but their jaw-opening muscles are weak. Wraps of almost anything will neutralize the 70 razor-sharp teeth and powerful jaws.

Also, the electrical tape is handy for releasing the captured gator. The vinyl stretches, allowing a handler to slip a small rope or line between the wraps and the underside of the gator's long snout. "There's a hollow there. You can feel it," Alfieri advises. Looping and tying the rope around the wraps, the handler can step away to a safe distance and then jerk on the rope, popping off the tape. Angry but free, the alligator should slink into the nearest water.

The tape trick is one of several Alfieri has acquired over the years. A graduate of N.C. State University, he worked for the Wildlife Commission and also in Florida and Massachusetts before coming to Alligator Adventure. He figures he's handled more than 20,000 crocodilians over the years, from American and Chinese alligators to caimans and other crocodiles. If it's a reptile, he's probably encountered it at least once.

The missing fingertip he attributes to once being overconfident. It's a lesson he hopes the wildlife officers absorb fully.

"People laugh at a 4- to 4½-foot alligator. 'Oh, I can take that,'" he warns. "But it's amazing the power they have. A 5- to 5½-footer is as dangerous as an animal gets. It can take any one of us, if it wants to."

The trick to getting a gator out of harm's way—either its own or someone else's—is to stay out of harm's way oneself. Again and again, Alfieri emphasizes the "safe zone" behind the alligator's front legs, where it can't reach. As for the tail, he recommends not worrying about it.

"Even if you've got its jaws taped shut, worry about the head more than the tail. Which is more powerful?"

Surprisingly, given their stubby legs and long bodies, alligators can easily outrun a human, at least over short distances and in a straight line. "Keep that in mind, if one ever runs at you," he warns. "They're not the most maneuverable of critters."

What they are is raw, predatory power, as he demonstrates when wrestling a 12-foot bull gator from mudhole to shore. Ropes around its neck are held taut by Lt. Brent Spivey and Sgt. Bill Lester, who have wrapped the ends around tree trunks to keep the brute immobile. Alfieri, in a safe zone that doesn't look all that safe, has dug his boots into the sand behind the gator's back legs to prevent a lunge. Calmly, he explains why shooting an alligator of this size is likely just to make it angrier.

"If you had to dispatch this gator, if there was no other way to protect lives, how would you do it? See how thick its skull is? How thick its hide is?" The uniformed officers nod their heads solemnly. "I've seen bullets bounce off their skulls."

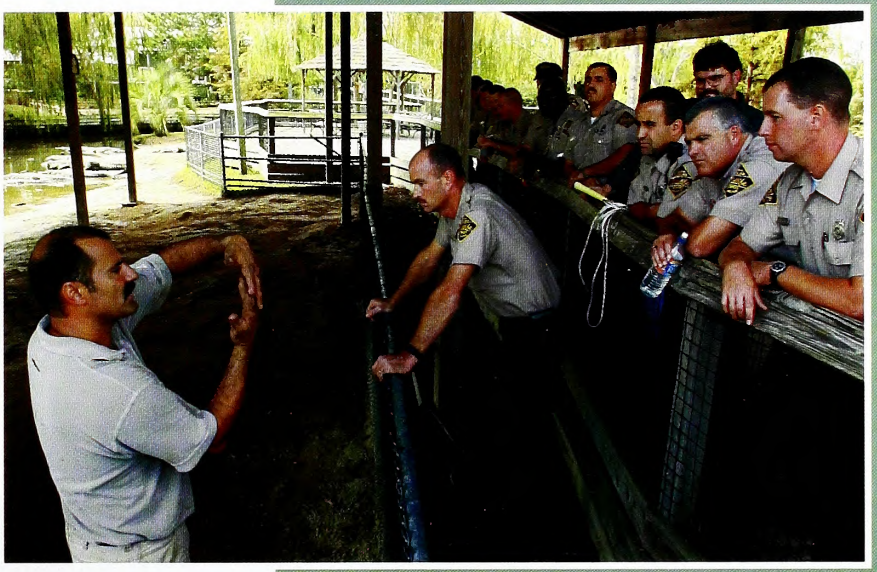
His practiced hands find a spot behind the skull, where the neck ends and its ridged, armored back begins. "If you have to, there's a spot right here, between its skull and its scutes, where you can sever its spinal cord."

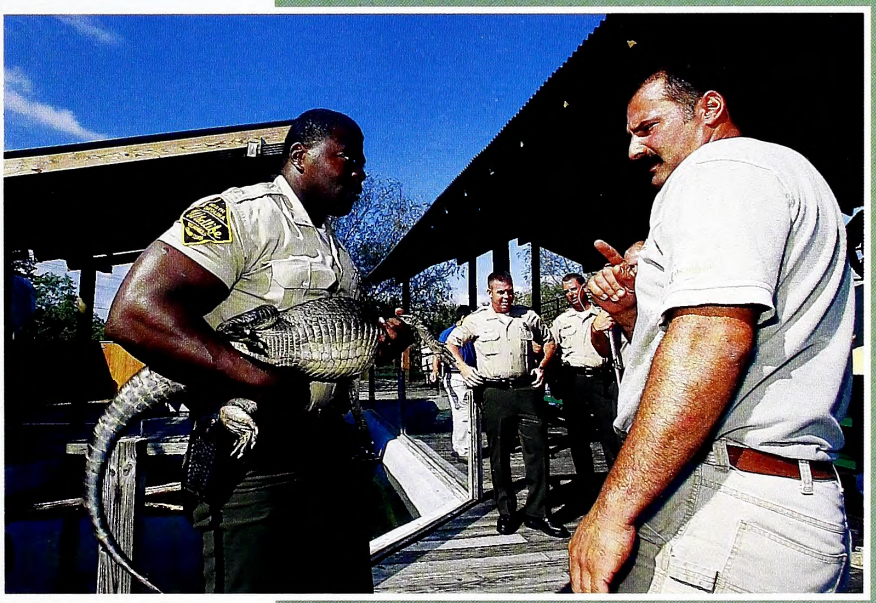
Alfieri relays that information with an air of regret. Having studied and worked with alligators all his adult life, he's developed a fondness for them. But he also is realistic.

"If you leave them alone, they'll leave you alone. But your Labrador or children swimming . . ." He leaves the thought unfinished. "The alligators were here first. It's their territory. They should be left alone. But that's not the reality." ◆

Brad Deen is a public information officer for the Wildlife Commission.

"PEOPLE LAUGH AT A 4-TO 4½-FOOT ALLIGATOR. 'OH, I CAN TAKE THAT,'" HE WARNS. "BUT IT'S AMAZING THE POWER THEY HAVE. A 5-TO 5½-FOOTER IS AS DANGEROUS AS AN ANIMAL GETS. IT CAN TAKE ANY ONE OF US, IF IT WANTS TO."





Decades of planning for urban greenways is finally paying off. Growing numbers of city dwellers who long for open spaces are getting more miles of nature trails close to home and work. New greenways in Charlotte and Raleigh bring wildlife and the outdoors within reach of thousands.

UrbanTrails:

Greenway Revives Little Sugar Creek

Charlotte's newest trail brings long-distance bikers straight through town.

written by Jack Horan
photographed by Nancy Pierce

One day a leafy corridor will run through Charlotte to the South Carolina line. Mecklenburg County is building a greenway that will encourage urban development, improve water quality and flood control, connect far-flung neighborhoods and offer a car-free pathway for walkers, joggers and bicyclists.

A major part of the greenways system, the Little Sugar Creek Greenway will span 15 miles from city to suburb. Plantings of native trees and shrubs will provide food and cover for wildlife and stabilize the banks of Little Sugar Creek.

The greenway is already emerging, section by section, along the creek that was once Charlotte's dirtiest stream. The trail now spans 3.6 miles in three disjointed segments along the creek.

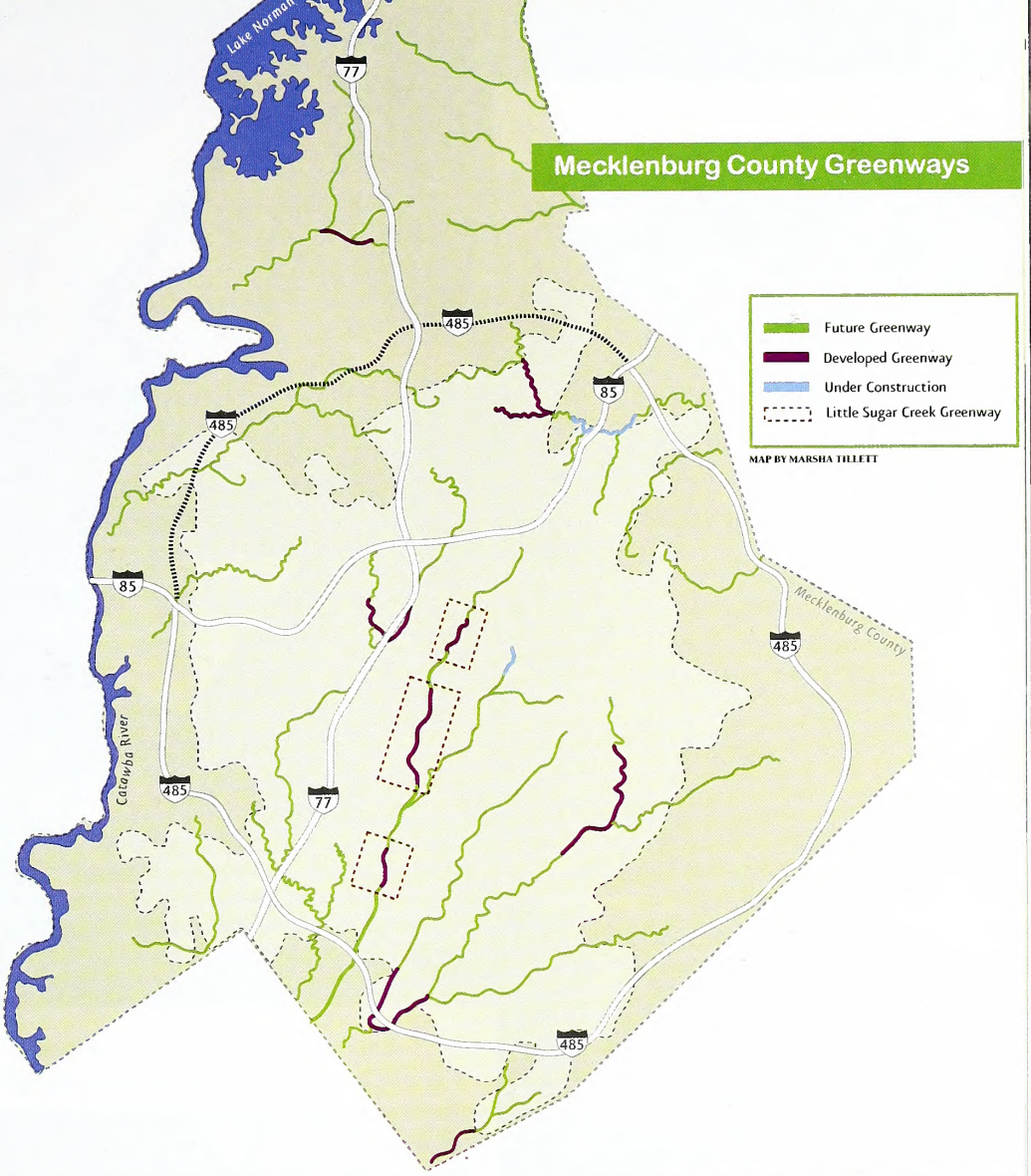
Little Sugar Creek springs to life in the Hidden Valley neighborhood about 5 miles north of downtown. As late as the 1950s, some Charlotteans referred to Little Sugar by its historical name, Sugaw, said to derive from a Catawba Indian word meaning "group of huts." The rill trickles along a weedy trench. Little more than an urban ditch in the downtown area, the creek disappears for two blocks under a parking lot at the former Midtown Square mall. It then regains its place in the

sun near Carolinas Medical Center and flows through Freedom Park.

This is the Little Sugar Creek that most Charlotteans know. Water purls around rocks as the stream passes tennis courts and the Nature Museum. Minnows dart about in pools, occasional blue herons forage for fish and black rat snakes hunt in crevices. Heading south, Little Sugar negotiates its way through suburban neighborhoods, collecting errant soccer balls and discarded plastic bottles, until it merges with Sugar Creek south of Pineville and enters the Catawba River about 5 miles east of Fort Mill, S.C.

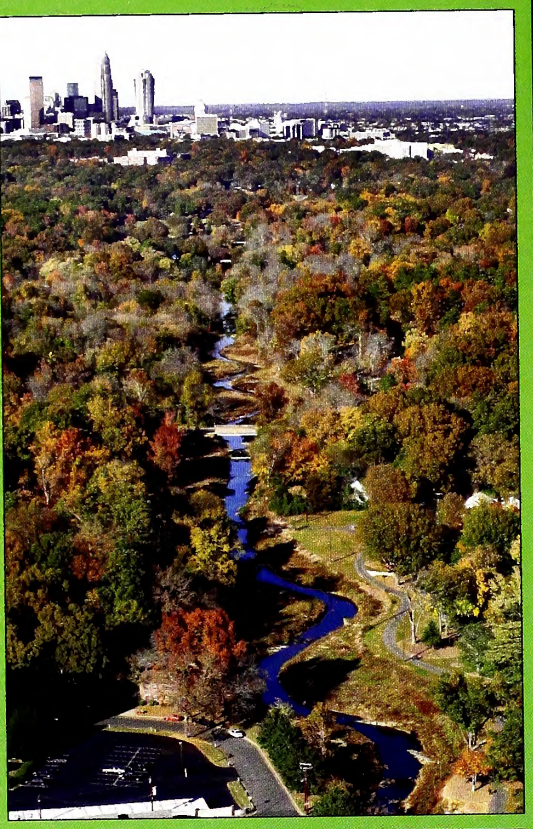
The 2-mile Freedom Park-Westfield section of the trail opened last year. It draws nearby residents Greg and Sue Crawford, who regularly walk their black Lab on the greenway. "It's getting people out of their homes," Greg Crawford said. "We just like to come down here and relax and talk and do something simple." The Crawfords say the streamside plantings blend with the mature willow oak trees bordering the greenway. "They did a good job making it look natural with the plant life," Sue Crawford said.

Near Carolinas Medical Center, the greenway morphs into a sidewalk with concrete walls and recessed concrete benches. It could well be called a "grayway." Early this



MAP BY MARSHA TILLETT

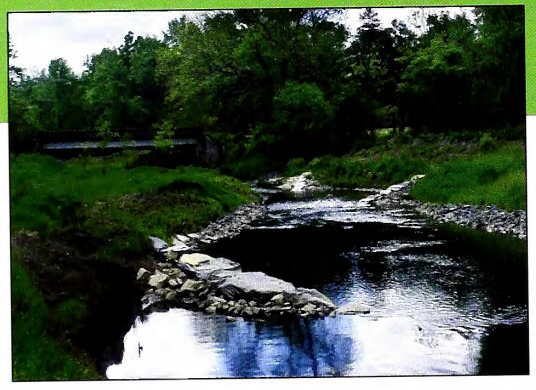
Terraced landscaping along the greenway bordering Charlotte's Little Sugar Creek helps contain the floodwaters of this urban watercourse.



JACK HORAN

JACK HORAN

Pedestrians using the Little Sugar Creek greenway may not realize that engineered meanders and rocky riffles (left) were added to the stream to slow water flow.



year a private-public venture put the "green" into the greenway with riparian-plant landscaping aided by $100,000 in private donations. The Liz Hair Nature Walk honors Hair, the first female chair of the Mecklenburg County Board of Commissioners and a greenway advocate.

North of the Medical Center, the county acquired 10 downtown acres for the greenway in 2004 at a cost of $17.3 million, closing down local businesses including fast food restaurants and a service station. Removal of the parking lot at Midtown Square Mall will allow the creek to emerge from its subterranean course. Here the greenway path will widen to a 15-foot-wide promenade; a 70-foot-wide fountain is contemplated. At the site of the demolished mall, developers plan a $143 million complex beside the greenway, with restaurants, offices and condominiums.

"I think the Little Sugar Creek Greenway will have a more urban feel once you get above Morehead Street," said Don Morgan, greenway services manager for Mecklenburg County. "We're skirting the edge of the downtown. People are having their lunch, yet there's a bicyclist who's come through from 7 miles away."

Farther north, the greenway will wind past Central Piedmont Community College, then duck under the John Belk and Brookshire freeways (Interstate 277). The greenway will tie into another completed trail section at the northern terminus. Completion of the downtown section of the trail is expected by 2009; officials hope to complete the rest of the trail through the southern suburbs and on to South Carolina by 2015.

Commuters could use the greenway to walk or bike to work at Charlotte's two major hospital and medical complexes, or to classes at the community college. "We're trying to get more people out of cars in that particular area," said William Chandler, who helped lead the successful $25 million greenway bond campaign in 2004. "We believe it will become [a transportation] option. More of the population is becoming health conscious."

Little Sugar's sweet name belies its stench of a few years ago. Street runoff laden with oil, grease and discharge from shops and factories polluted the water, snuffing out fish and wildlife. It was a receptacle for shopping carts, tires and other refuse. A 15-year cleanup effort has improved water quality dramatically. I've caught and released half a dozen redbreast sunfish and an 8-inch-long largemouth bass in an hour of fishing Little Sugar Creek downstream of downtown Charlotte.

As the greenway grows, restoration of the creek continues, section by section. Ponds bordering the creek trap pollutants from stormwater, store runoff and gradually release the water into the creek. Aquatic plants such as softstem bulrush, pickerel weed and bald cypress remove nutrients in fertilizer that washes off from nearby lawns. "Streamscaping" improvements beside the paved greenways include plantings of native trees and flowers. Engineers constructed stream bends and in-stream rock vanes to slow flood waters and prevent bank erosion.

Silky dogwood, silky willow and sycamore saplings were planted in floodplain terraces. When heavy rains hit the terraces, plants and trees filter the water. "The idea is to make as much water as possible to travel across as much vegetation as possible before it gets into the creek," said Jim Matthews, an environmental consultant who supervised the landscaping efforts. Riffles have been added to the creek bed to aerate the water and back up pools to slow the current, which will help reduce bank erosion. The pools in turn create habitat for fish, turtles and dragonflies.

In three years, within sight of Charlotte's skyscrapers, a new 1.9-mile segment of the Little Sugar Creek greenway and a revitalized creek will create a place to stroll, eat and enjoy the outdoors. Within a decade, officials hope, a ribbon of blue and green will carry thousands of people along a 15-mile route. Songbirds and sunfish will coexist with moms pushing strollers, commuters biking to work and out-of-towners sipping coffee at outdoor cafes along an urban promenade. ◆

Jack Horan is outdoors correspondent for The Charlotte Observer *and the author of "Where Nature Reigns: The Wilderness Areas of the Southern Appalachians."*

Urban Trails:

Raleigh's greenway system soars above the beltline to enter an urban haven of art and nature.

written by Joseph Covington
photographed by Peter Hutson

Fresh Air and Art

A stroller or two can usually be found on the trail outside the "stick house." Small flashes of movement appear and disappear through the various openings as children explore inside. "Cool!" is their most common exclamation as they wander through this monumental work of sculpture by Orange County artist Patrick Dougherty.

Dougherty's "Trail Heads" guards a bend in the Green Trail, the first pathway created in the 164-acre park on the grounds of the N.C. Museum of Art in Raleigh. The trail was the first step in the gradual transformation of a former prison farm into an urban oasis of green known as the Art Park. The state museum recruited landscape designers, ecologists, professors, artists, curators and volunteers to sculpt a vision of a different kind of urban space, one that offers downtown and suburban residents an outdoor experience with nature and art.

A bridge links inside-the-beltline hikers and bicyclists with the Museum Art Park and a trail system that leads to Umstead State Park.

JOSEPH COVINGTON

Native prairie plants attract a locust borer on a winding interpretive trail on the grounds of the N.C. Museum of Art. On a woodland path above the prairie, the Cloud Chamber (below right) allows visitors to perceive their surroundings in a different light.

Art Park visitors come from far and near, some biking for miles along the Capital Area Greenway system, a transportation corridor that is emerging as an alternative to cars. The museum's trails connect to the citywide system via the longest pedestrian bridge in North Carolina, a graceful span that crosses the six-lane Raleigh Beltline. From the Art Park, trails one day will link the inside-the-beltline greenways with Raleigh's Crabtree Valley Mall, Umstead State Park and points beyond.

As part of the greenway system, the Art Park trails attract bicyclists throughout the day. Joggers arrive from suburban neighborhoods and nearby Meredith College via the pedestrian bridge. Mornings see mothers with strollers, and afternoons are inviting for walkers with leashed dogs, which are welcome on the paved trails. The Wednesday Walkers, the Stroller Striders, the Sierra Club and even a high school cross-country team are frequent users of the trails.

Works of art along the trails reflect their surroundings. Dougherty made the "stick house" from red maple saplings. When the wood deteriorates in a few years, he intends for the art to be taken down and the site to be allowed to revert to nature. Close by, Thomas Sayre's trio of huge concrete rings, "Gyre," stands solidly in testimony to the artist's inspiration: the rotation of Earth. Colored with an iron oxide stain, the concrete rings were cast on-site and are studded with small quartz pebbles and clay. Up the trail, Vollis Simpson's "Wind Machine" towers above a horse pasture. This giant whirligig seems to frolic with the wind as its many rotating parts spin in response to prevailing air currents. The horses seem to like gathering under it, and the Eastern bluebirds that nest along the fence sometimes perch on top.

At the eastern end of the park, the trail crosses House Creek via a wooden bridge. There school groups gather to participate in "Water Quality/Quality of Life" programs presented by park guides. In this small, urban stream, kids find crayfish, black-winged damselfly larvae and other small creatures whose presence indicates the quality of the water.

The path enters a bottomland forest and then rises up a slope to drier, more open woods dominated by loblolly, shortleaf and Virginia pines, along with blackjack oaks. The eroded, formerly agricultural land now supports savanna-like habitat. Blueberry bushes, wild quinine and bird's-foot violets grow beside pineywoods goldenrod, a small plant that blooms early in summer when other species are still developing buds. These species are interspersed with a notable patch of grass-leafed liatris, which blooms in autumn with other goldenrods. Before the trail reaches its highest point near the pedestrian bridge, it traverses a large grove of flowering dogwoods. This habitat is adjacent to two busy highways masked by forest buffers.

The park's paved trails invite bicyclists, strollers and skaters, but the unpaved pathways are for foot traffic only. The mulched Woodland Trail leads into the woods, crosses an unnamed creek at the foot of the largest umbrella magnolia in the preserve and climbs a bluff to the most intimate experience the trail has to offer, the "Cloud Chamber for the Trees and Sky." British nature artist Chris Drury conceived a stone chamber that envelops visitors in a quiet, poetic encounter with treetops and passing clouds. Children who discover it for the first time proclaim it a house for cave people, trolls or fairies. Guides may tell children waiting to enter the space, "When the door is closed, the interior becomes dark, and when your eyes adjust to the darkness . . . something happens." The

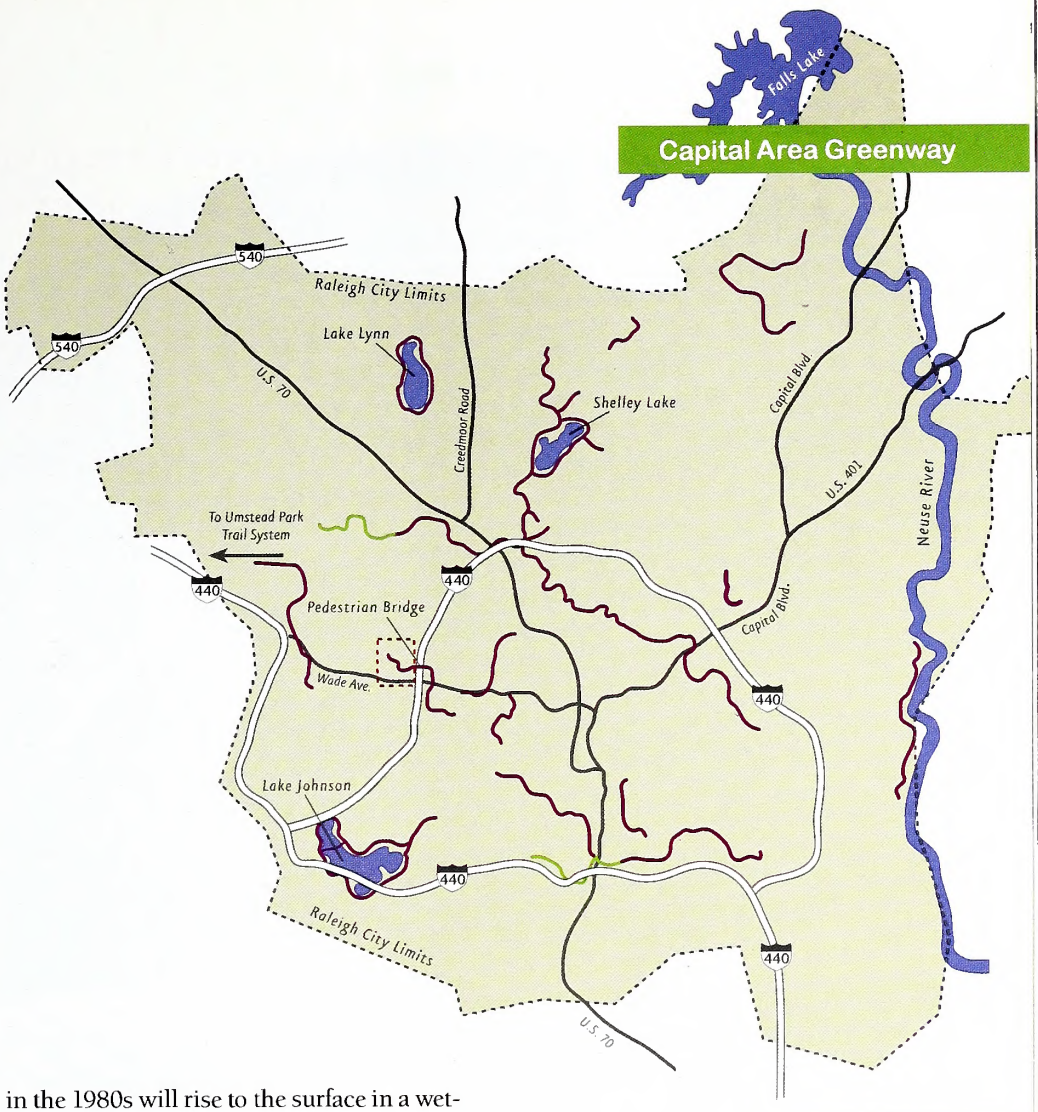
experience is best when it's a surprise. Below the chamber, among Christmas ferns and cranefly orchids, a gray fox has made its den.

As the Woodland Trail rises in a loop, the forest changes. At the bottom of the trail is the official champion tulip poplar tree of Wake County. Higher on the slope are stands of persimmon and lesser-known species such as silky dogwood, which bears clusters of bright blue berries. These native treasures compete with invasive shrubs that have been introduced from cultivated sources by wildlife or the elements. Chinese privet, autumn olive and Japanese stiltgrass are the most pervasive. The NCSU College of Natural Resources is advising the museum on restoring the area to native plants.

The Prairie Trail crosses an open field that is planted in native warm-season grasses and wildflowers found in Piedmont prairie habitat. Along the trail is a newly established colony of purple martins, which saw its first nesting pair last spring. The trail winds down the field to cross House Creek and returns to the Capital Area Greenway system through moist woods that harbor fine stands of broad beech and sensitive ferns.

Along the way, signs point out habitats, plants, animals and works of art. From the museum's learning center, families can borrow backpacks filled with materials for nature study and outdoor games. Groups can schedule guided tours with park guides. A portfolio of images from the park — butterflies, birds and plants — is posted at www.ncartmuseum.org.

Coming up in the future is the conversion of the museum's stormwater retention pond into a demonstration of exemplary water management practices. Concentric bands of native species, from wetland plants at the pond's edge to upland grasses, will be crossed by trails. A spring that was piped underground when the museum was built in the 1980s will rise to the surface in a wetland area. These and other water features will transform the old runoff pond into yet another highlight along a fascinating urban trail. ⬘



MAP BY MARSHA TILLETT

Joseph Covington is an avid birder and curator of the Museum Art Park.

The Art Park is free and open daily during daylight hours. Call (919) 664-6782 for information or visit ncartmuseum.org.

They can gnaw through walls, squeeze through coin-sized holes and live unseen in your own house. These amazing creatures are

Alien Rats and Mice

written by Julie Dunlap / illustrations by Consie Powell / nature activity by Anne M. Runyon

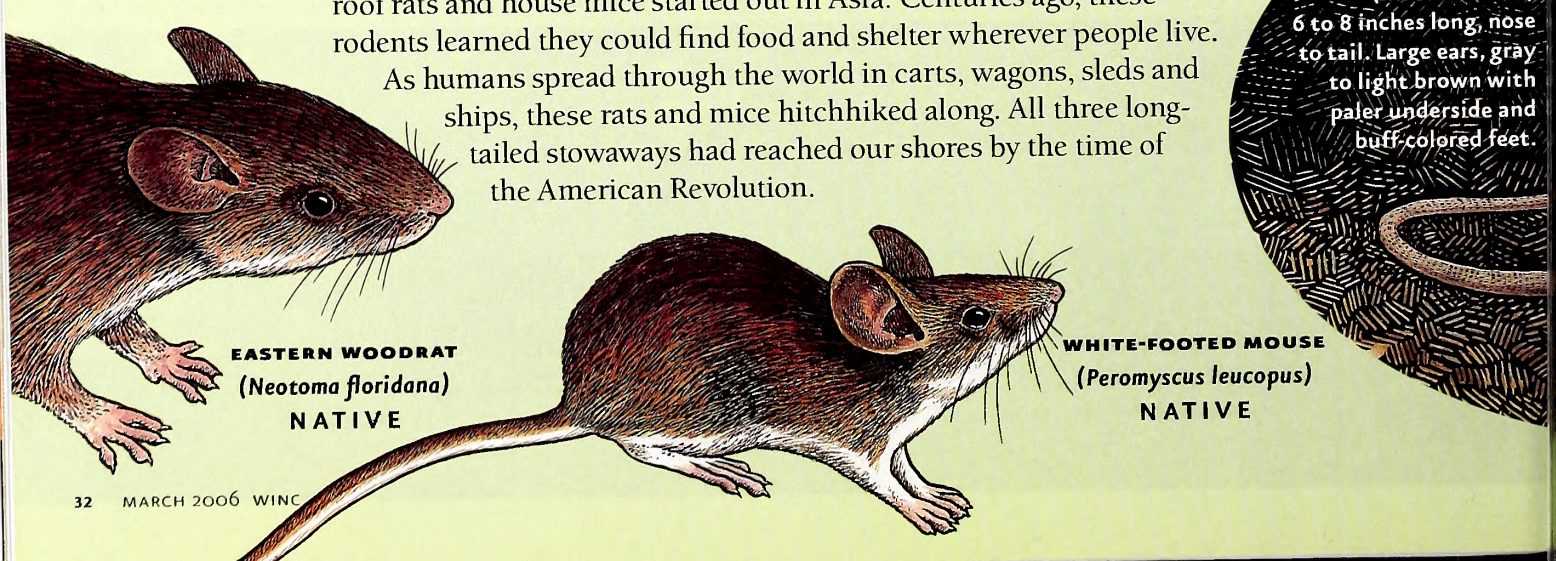
ROOF RAT *(Rattus rattus)*
NONNATIVE
6 to 8 inches long not including tail. Large eyes and ears compared with Norway rat, tail longer than body usually. Also known as black rats, these rats nest in trees in the wild and may eat eggs and nestlings of tree-nesting as well as ground-nesting birds.

Like squirrels, beavers and porcupines, rats and mice belong to a huge group of animals called rodents. The name "rodent" comes from a Latin word meaning "to gnaw," and all rodents are built to bite. Their four large front teeth, or incisors, are sharp as knives and hard as nails. Different rodents' teeth are used for tasks from nibbling seeds to digging tunnels or gnawing down trees. These talented teeth are a big reason why rodents are such a varied and successful group; almost half of all wild mammals are rodents.

RAMBLING RODENTS

In North Carolina, native rodents include woodrats, cotton rats and white-footed mice. But like the rest of the U.S. and most of the world, North Carolina is also home to nonnative rodents. Norway rats, roof rats and house mice started out in Asia. Centuries ago, these rodents learned they could find food and shelter wherever people live.

As humans spread through the world in carts, wagons, sleds and ships, these rats and mice hitchhiked along. All three long-tailed stowaways had reached our shores by the time of the American Revolution.



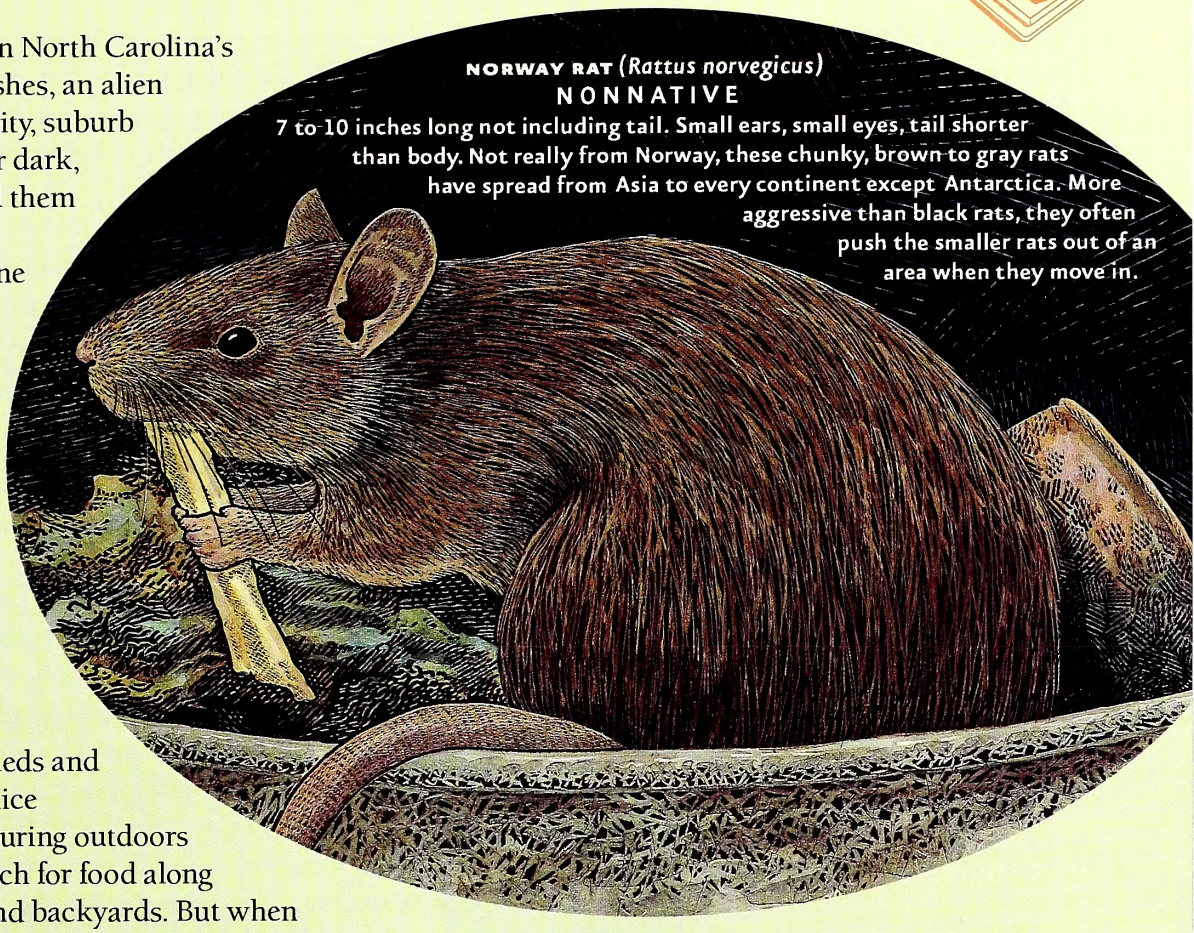
HOUSE MOUSE
NONNATIVE
(Mus musculus)
6 to 8 inches long, nose to tail. Large ears, gray to light brown with paler underside and buff-colored feet.

EASTERN WOODRAT
(Neotoma floridana)
NATIVE

WHITE-FOOTED MOUSE
(Peromyscus leucopus)
NATIVE

UNWELCOME GUESTS

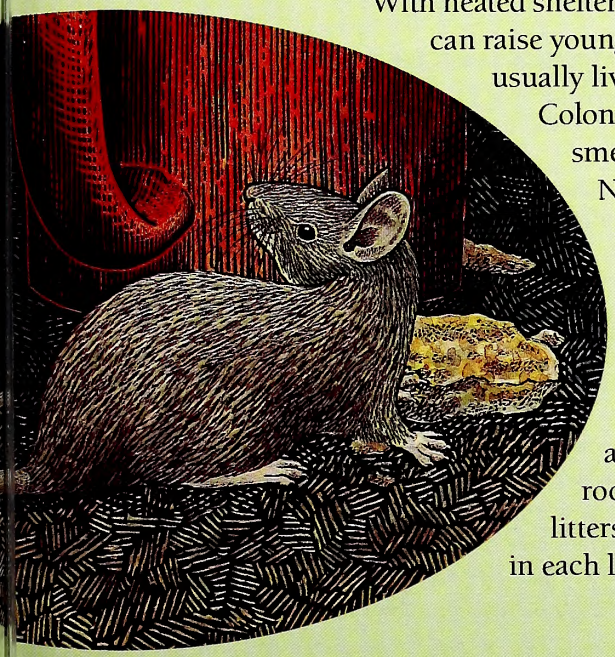
While native rodents live in North Carolina's woods, meadows and marshes, an alien rodent's habitat may be a city, suburb or farm. Norway rats prefer dark, damp places, so you'll find them in city basements, subway tunnels and sewer lines. Fine diggers, Norway rats also excavate burrows around apartments, barns and other town and country buildings. Roof rats are better climbers than Norways, and they nest on roofs, in attics and on ivy-covered walls. House mice scurry under floorboards, up walls and between ceiling panels in houses, cabins, garages, sheds and stables. In spring, house mice sometimes "go wild," venturing outdoors to live in burrows and search for food along grassy runways in fields and backyards. But when temperatures drop in the fall, they scurry inside again.



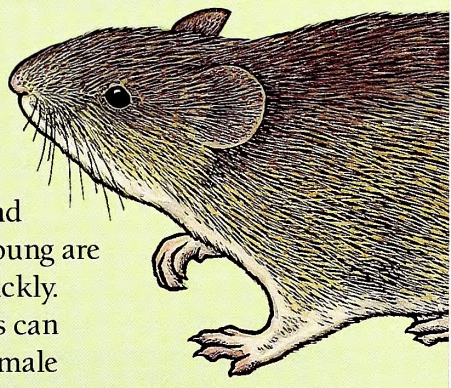
NORWAY RAT *(Rattus norvegicus)*
NONNATIVE
7 to 10 inches long not including tail. Small ears, small eyes, tail shorter than body. Not really from Norway, these chunky, brown to gray rats have spread from Asia to every continent except Antarctica. More aggressive than black rats, they often push the smaller rats out of an area when they move in.

Indoors, house mice and rats find not only warmth but also plenty of food. Omnivores, they will eat almost anything. Mice search at night in cupboards, on countertops, and under kitchen tables for leftover bread, gnawable cereal boxes and, of course, cheese. Rats will raid pantries and trash bins, gobble up spilled bird seed and snack from the dog's bowl when it's not looking.

The main difference between rats and mice is size. Rats are medium-sized rodents with long, thin tails. Mice are the smallest rodents, also sporting long, thin tails. The many different kinds of rats and mice are not always closely related.



With heated shelters and food supplies, alien rats and mice can raise young year-round. These social animals usually live in extended family groups or colonies. Colony members recognize each other by smell and chase away any strangers. Norway rat females give birth in special nursery chambers in their burrows, and Norway rats, roof rats and house mice shred socks, paper and other soft debris to line their nests. Young are born naked and helpless but grow quickly. When about three months old, females can already have litters of their own. One female roof rat, for example, might have six litters per year, with six to eight pups in each litter. That's a lot of rats!



HISPID COTTON RAT
(Sigmodon hispidus)
NATIVE

GNAWING PROBLEM

A large mice or rat population can do serious damage. While searching for food or collecting nest materials, the rodents destroy books, clothes, bedding and toys. Grain in storage bins around the world is either gobbled or contaminated by rat and mouse droppings. Gnawed wires can even set buildings on fire.

Still worse, rats and mice can carry dangerous diseases to their human neighbors. From their sewer burrows, Norway rats lift bacteria into buildings like germ elevators. A flea sometimes found on roof rats can carry the plague, a fatal disease that killed so many Europeans in the 1300s that the illness is called "The Black Death."

Nonnative rodents cause problems in the natural environment, too. When house mice summer outdoors, they carry diseases to deer mice and other species, sometimes taking over habitats where natives usually live. Native wildlife on islands suffers most from introduced rats. In Maine, puffins nesting in burrows may lose eggs or chicks to Norway rats, and black rats raid island bird nests on the ground and in trees in California, New Zealand and around the world.

Yet native mice and rats are important parts of their environment, essential prey for hawks, owls, snakes, foxes and other predators. While conservationists are working to keep nonnatives from threatening other wildlife, they also want to make sure that alien rodents don't give all mice and rats a bad name.

House mice and Norway rats are the wild ancestors of specially bred rodents that have helped improve human health or become treasured pets. Research using laboratory rats and mice has led to discoveries important to medicine. Pet owners also breed rats and mice to be colorful, amusing companions to the family.

Rodent teeth grow continuously so the constant nibbling doesn't grind them down to nubs.

Get Outside

Are there aliens in your space? Finding Norway rats, roof rats, or house mice around your home isn't good news. But if they're there, you need to know. How can you tell? Look for signs such as gnaw marks on trash bags or flour and pet food sacks, nesting materials in unused drawers or old wood piles, or droppings in the closets or cupboards. Norway rats regularly use the same routes to get from place to place, leaving dark body oil rub marks along the walls where they pass. You may also spot Norway burrows around the building foundations or roof rat nests in English ivy on the walls. Even if you don't find signs of rats or mice, it's a good idea to keep them away by reducing their habitat. Simple things, like cleaning up under outdoor bird feeders, storing dog food in rat-proof containers, and picking up spilled garbage can discourage nonnative rats and mice from calling your house "home."

Read and Find Out

- "A Look through the Mouse Hole" by H. & A. Fischer-Nagel, Carolrhoda Books, 1989.
- "Rats: Observations on the History and Habitat of the City's Most Unwanted Inhabitants" by Robert Sullivan, Bloomsbury, 2004.
- "Outside and Inside Rats & Mice" by Sandra Markle, Atheneum, 2001.
- "Rats! The Good, The Bad and The Ugly" by Richard Conniff, Crown Publishers, 2002.
- "Scary Creatures: Rats" by Gerald Legg, Franklin Watts, 2003.

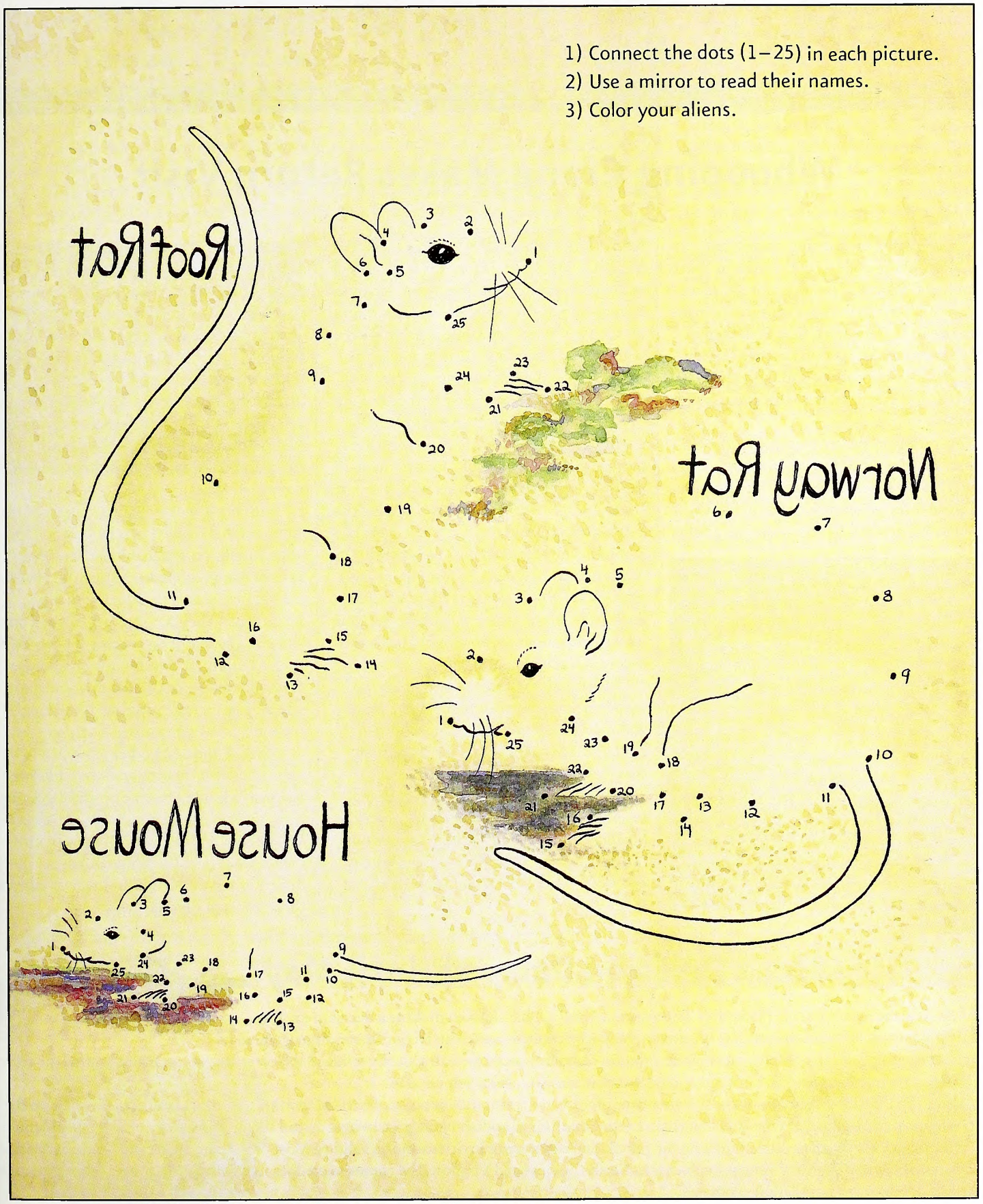
On the World Wide Web:

- Web page for the North Carolina Nature Conservancy's efforts to control invasive species: www.nature.org/wherewework/northamerica/states/northcarolina/initiatives/index.html

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Connect the Dots to Find the Aliens!

1) Connect the dots (1–25) in each picture.
2) Use a mirror to read their names.
3) Color your aliens.



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Whooping Crane Makes Return Visit

One of three whooping cranes that spent the 2004–2005 winter in North Carolina ("Winter of the Whooping Cranes," October 2005) made a brief appearance in the state again in December, near Washington. Whooping cranes, once on the edge of extinction, now number about 330 individuals in the U.S. and are protected as an endangered species.

According to Walter Sturgeon of the N.C. Museum of Natural Sciences, the bird, designated No. 309, was disoriented and has not returned to its wintering grounds in Florida or its breeding grounds in Wisconsin since being led to Florida in the fall of 2003 by Operation Migration's ultralight plane. The crane, which wintered in Jones County last year, separated from the other two birds and spent last summer in New York. The crane was outfitted with a transmitter, but the device malfunctioned and biologists had lost contact with the crane, a female approaching breeding age.

INTERNATIONAL CRANE FOUNDATION

Sam Mayo of Blounts Creek in Martin County spotted the crane while taking his mother grocery shopping. "I have a habit of looking for eagles or whatever birds I can see while I'm out," Mayo said. "I was driving past a catfish pond and saw four or five great blue herons making some kind of disturbance. One of the herons flew right in front of me, and after I saw I wasn't going to hit it, I looked back at the pond. There was a bird standing on the bank toe-to-toe with one of the herons, except it was about 10 inches taller."

The strange sight sent Mayo to his bird book when he returned home. "The shape and stance matched that of the whooping crane," Mayo said. "It was the only thing that looked close."

When Mayo and his three brothers got together at his mother's house for a weekly breakfast, he asked his mother to pick out the bird she saw. "She picked the whooper, and my brothers just about laughed us out of the room."

Mayo, along with one of his brothers, returned to the pond on Sunday and saw the crane again. He took some photographs, but with the bird against the setting sun, the crane's colors did not show very well. "On Monday, I went back and got within 75 or 100 feet and there was no doubt." Mayo alerted the *Washington Daily News* and sent an e-mail, with a photograph attached, to Operation Migration. By the following morning, biologist Richard Urbanek had contacted Mayo.

Within a few days, Sara Zimorski of the International Crane Foundation and Operation Migration's Richard vanHeuvelen arrived from Florida to capture the bird and take her to Florida to winter with other whoopers. "They put their white suits on, and had a couple of ears of corn for her," Mayo said. "Within 30 minutes, they had captured her and took her to the Greenville airport, where they had a jet waiting. It was one of the most fascinating things I've ever seen."

No. 309 joined 23 other whoopers who had completed their migration to Florida's Halpata Tastanki Preserve by mid-December. Another flock winters at Aransas National Wildlife Refuge in Texas. Of the two other cranes who spent the winter in Jones County, one returned to North Carolina last fall, and the other is in Florida.

Gray Trout Decision Delayed Until May

DUANE RAVER

The Atlantic States Marine Fisheries Commission (ASMFC) has delayed making a decision on gray trout harvest restrictions until its meeting in May. The commission, which coordinates management of migratory fish species in coastal waters of the Atlantic seaboard, could have drastically reduced the commercial catch and limited the recreational take to one fish per day. The recreational limit currently is seven fish per day.

Also called weakfish, gray trout populations have plummeted, primarily because of natural mortality. Louis Daniel, a biologist with the N.C. Division of Marine Fisheries and chairman of the ASMFC's weakfish management board, said the commission wants independent scientists to review the data used in making the population assessment to determine its validity. Most of the data used came from the Marine Recreational Fishery Statistics Survey conducted in North Carolina and Virginia. The commission does not consider these data reliable enough to use in determining population estimates.

They're Young, Female and Shooting Shotguns

The number of teenage girls participating in shotgun sports in the United States is up dramatically over the past five years. Across the sports of trap, skeet and sporting clays, the number of female participants age 12 to 17 rose 56 percent—from 133,000 to 208,000—between 1999 and 2004, according to a National Sporting Goods Association report.

The upward trend also has been seen in the National Shooting Sports Foundation's (NSSF) Scholastic Clay Target Program (SCTP), which in 2005 alone saw an 84 percent increase in participation by girls in elementary and high school. "Nationwide, over a third of all female participants in shotgun sports today are under 24," said Cyndi Dalena, NSSF director of shooting sports development. "There's a growing youth movement in shooting, and it's a credit to the many programs that are opening doors and creating opportunities for women of all ages to enjoy outdoor lifestyles."

BB GILLEN

In a 2005 SCTP survey, 94 percent of parents said the competitive shooting program is a positive influence in their child's development. Parents observed improved responsibility, teamwork, sportsmanship and leadership skills. In fact, 98 percent of SCTP parents believe shooting is just as important as other sports, and 94 percent would support shotgun sports as a school-based athletic program.

"Part of the attraction and uniqueness of trap, skeet and sporting clays is that girls can compete with boys," said Dalena. "Shooting is not all about strength or speed. It's also about coordination and concentration, and more and more girls are discovering that those skills are great equalizers."

Overall, there were 1,309,000 total female participants of all ages in shotgun sports in 2004, up 11 percent from 1,177,000 in 1997. Growth also is being documented in hunting. In 2004, 2,426,000 women of all ages hunted, up more than 20 percent compared to 2,018,000 in 1997.

SCTP, now in its fifth year, provides schoolgirls and boys nationwide with the chance to compete as a team for state and national championships in trap, skeet and sporting clays. Other youth programs such as 4-H Shooting Sports and the Boy Scouts of America's Venturing Program are also opportunities for youths to get involved in shooting sports.

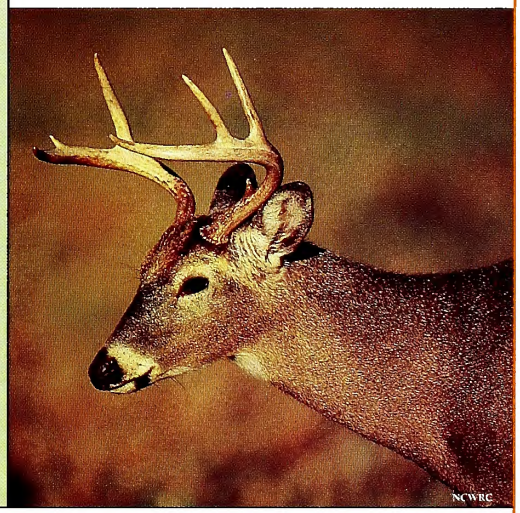
The Becoming an Outdoors-Woman program and the National Wild Turkey Federation's (NWTF) Women in the Outdoors program focus specifically on introducing women to activities like shooting and hunting. The N.C. Wildlife Resources Commission's next BOW workshop is scheduled for June 2–4 at the Eastern 4-H Center in Columbia in Tyrrell County. For more information, contact BB Gillen at (919) 707-0172 or e-mail bb.gillen@ncwildlife.org.

Deer and Gear on Display at Dixie Deer Classic

The Dixie Deer Classic, one of the most popular outdoor shows in North Carolina, will be held at the N.C. State Fairgrounds in Raleigh on March 4–6. The Wake County Wildlife Club, which runs the show, will have trophy competition in 12 categories. All the entries will be scored by the Boone & Crockett method, and scoring officials from both Boone & Crockett and Pope & Young will be present.

One trophy whitetail will be scored free with the purchase of show admission ($10 for anyone 12 years of age and older). Additional trophies will be scored for $5 each. Competition entry closes at 6 p.m. on Saturday, March 5. Awards will be presented on Sunday at 4 p.m.

Also, approximately 200 exhibitors will be on hand to display hunting and outdoor equipment. Among the speakers at this year's event will be noted outdoor writer and hunter Craig Boddington. For more information, contact the Wake County Wildlife Club at (919) 782-5333 or visit www.dixiedeerclassic.org.



NCWRC

ON PATROL

ILLUSTRATED BY JACKIE PITTMAN

District 8 Sgt. Russell Byerly and Officer Chad Arnold were checking fishermen at Mountain Island Dam one Friday afternoon. While walking the bank, Arnold radioed Byerly to come to his location because he had a man in the water with goggles, flippers and a spear gun. The man would not come out of the water, and kept diving and hiding around the rocks.

Arnold had already found a largemouth bass with an arrow wound tied to a stick on the bank. After about 45 minutes, Officer Arnold finally noticed the man under a rock jutting out at the water's edge. The underwater angler was charged with having no special device license, fishing during closed season and unlawful taking of game fish.

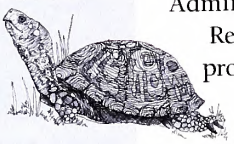
CALENDAR OF EVENTS

SUNDAY, MARCH 5

Listen as Betsy Green Moyer, Byrd Green Cornwell and Ken Moore discuss their work on "Paul Green's Plant Book: An Alphabet of Flowers and Folklore" at the Totten Center in the N.C. Botanical Garden in Chapel Hill. The center will unveil an interpretive exhibit in the Paul Green Cabin. Visit www.ncbg.unc.edu or call (919) 962-0522.

SATURDAY, MARCH 11

Check out Reptile and Amphibian Day at the N.C. Museum of Natural Sciences in Raleigh. Visit www.naturalsciences.org.



FRIDAY-SUNDAY, MARCH 17–19

Learn about minerals and gems at the 36th annual Unifour Parade of Gems at the Hickory Metro Convention Center in Hickory. Contact George Max at (828) 328-9107 or Eric Fritz at (828) 495-7031.

SATURDAY, MARCH 18

Whet your appetite for wild-game cooking at the 11th annual N.C. Wildlife Action Wild Game Cookoff and Sportsmans Expo at the Lake Waccamaw Boys and Girls Home Exhibition Center from 10 a.m.–4 p.m. Contact (910) 646-6458 or visit www.wildlifeaction.com.

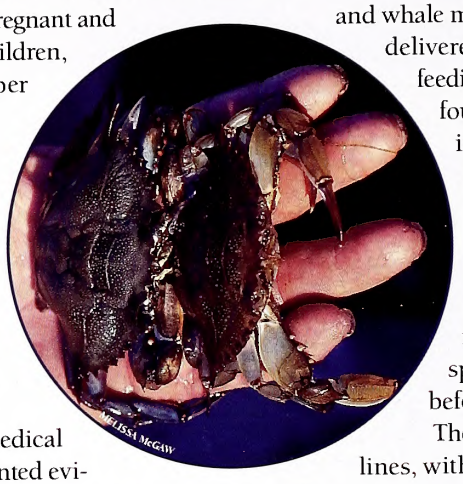
TUESDAY, MARCH 28

Find out more about the financial benefits of conservation easements at a workshop at the Masonic Home for Children in Oxford. Sponsored by the Tar River Land Conservancy, the workshop will feature guest speaker Stephen Small, who wrote the federal tax regulations on conservation easements in the 1980s. For more information, contact (919) 496-5902 or visit www.tarriver.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Scientists: Eat More Seafood

Backed by science that links seafood consumption to reduced risk of disease, the U.S. government has recommended that all Americans, especially pregnant and nursing women and children, eat two seafood meals per week that are rich in omega-3 fatty acids. This recommendation is included in the USDA's new dietary guidelines and is being reiterated by the National Oceanic and Atmospheric Administration.



Researchers and medical professionals presented evidence linking the relationship between seafood and health during an international science conference in December in Washington, D.C.

By eating the right kinds of seafood, pregnant and nursing women pass to their babies important nutrients that aid in brain development and may lessen the effects of dyslexia, autism, hyperactivity and attention deficit disorder, according to scientists presenting at the conference. Studies also linked these nutrients with increased intelligence in infants and young children. Species that are rich in these nutrients—omega-3 fatty acids, iodine, iron and choline—include wild and farmed salmon, shrimp, pollock, cod, canned light tuna and catfish.

Women will not put their babies at risk of mercury poisoning if they avoid eating shark, swordfish, tilefish, king mackerel, tuna steaks and whale meat until after they have delivered and stopped breast feeding. Exposure to mercury found in those species during the sensitive stages of fetal brain development may cause neurological damage. As an extra precaution, women who plan to become pregnant should avoid those species for six months before conception.

These are conservative guidelines, with a 10-fold safety margin built in for precaution. Scientists reiterated that there is no evidence of health risk to the rest of the population, including children and the elderly, from eating seafood. To the contrary, studies have shown seafood consumption to help people live longer, healthier lives. Seafood cuts the risk for heart disease, cancer, Alzheimer's, stroke, diabetes and inflammatory diseases such as rheumatoid arthritis.

Further, studies show that nutrients found in fish and shellfish help the body heal after cancer treatments, and ward off autoimmune conditions, allergies, asthma, migraines, skin conditions and Crohn's disease. Research also shows that more nutrients are retained in fish that is baked or broiled, rather than processed or fried.

did YOU know?

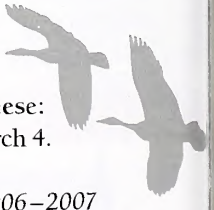
Saltwater anglers broke North Carolina records for three different species in 2005. In September, 16-year-old Jesse Lockowitz of Carteret County landed a 175-pound tarpon while fishing from Bogue Inlet Pier. Lockowitz, fishing a live bluefish attached to a 100-pound wire tied to 5 feet of 80-pound mono on 20-pound line, used a balloon rig to drift his bait 200 yards out to the tarpon.

After two hours of battling the fish, Lockowitz managed to land the tarpon with the help of three gaffs and six other fishermen. His catch bettered the previous mark by 11 pounds.

Earlier in 2005, Derek Williams of Tampa, Fla., caught a world-record 21-pound, 6-ounce hog snapper off Frying Pan Shoals, and Brandon Bailey of Moneta, Va., landed a state-record 185-pound thresher shark off Oregon Inlet.

IN SEASON

This month, these hunting seasons are open in North Carolina:



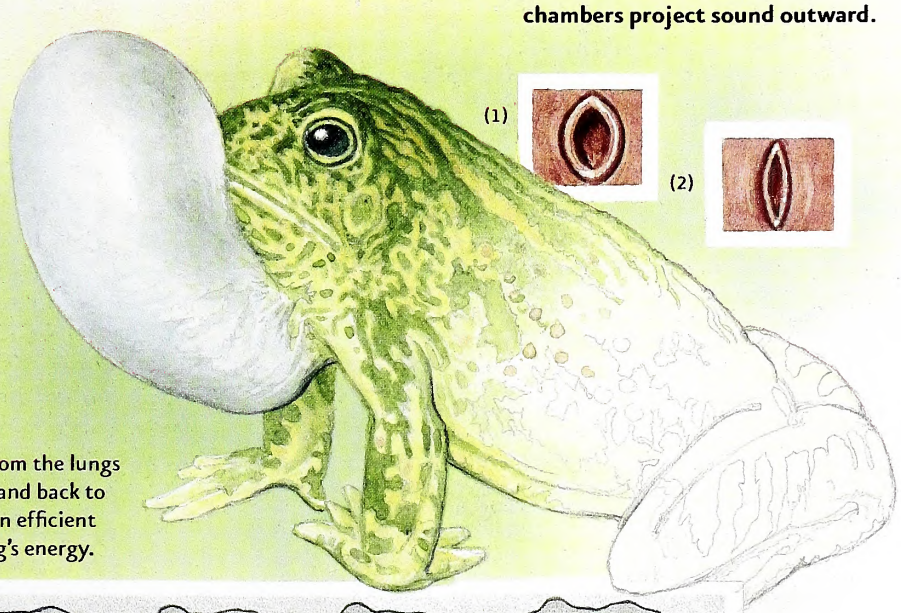
Snow, Blue and Ross' Geese: Through March 4.

Check the *2006–2007 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

How Do Frogs And Toads Sing?

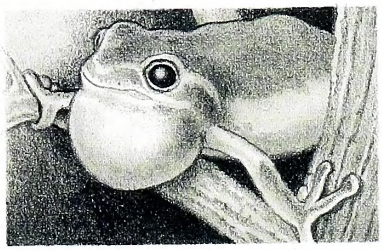
written by David S. Lee
illustrated by David Williams

FROG SONGS ARE CREATED BY THE combination of voice box, muscles and vocal sacs that is unique to each species. Only males possess vocal sacs, which they inflate when vocalizing. The air-filled chambers project sound outward.



Sound is produced by the voice box (a modification of the frog's windpipe). Two muscle bands stretch across the voice box. The frog forces air across these muscles, causing them to vibrate. Different pitches result when the frog (1) relaxes or (2) tightens the muscles.

Air recycles from the lungs to the air sac and back to the lungs—an efficient use of the frog's energy.



treefrog

bullfrog

Males of large species such as the bullfrog have deep, bellowing voices, sing for long periods and can be heard from far away. Their calls carry well even underwater, where females are likely to be. Some treefrogs make their voices carry farther in the night air by climbing higher, like a town crier in a watchtower.

Visiting Old Friends

written by Jim Dean

So you've been a loyal subscriber to *Wildlife in North Carolina* for a long time, have you? If so, be forewarned that this may make you feel older than dirt (it did me). As a result of the magazine's recent move to new quarters, I've taken a little trip down memory lane.

Do you remember when a year's subscription was 50 cents for 12 issues, including postage? That's what it cost when I arrived at the agency in the late 1960s. Rod Amundson was the editor, having been hired out of Nebraska by Clyde Patton shortly after the N.C. Wildlife Resources Commission was reorganized from the old Department of Conservation and Development in 1947. Clyde was the agency's first permanent executive director. In those early years, Rod put the magazine together alone, winning a first-place national award in 1956, and he also wrote all the agency's news releases. When Duane Raver transferred from his position as fisheries biologist to become managing editor in 1960, he took over sole production of the magazine. Duane became editor after Rod retired in 1975.

Rod may be best remembered for his multi-subject column "Crackshots and Backlashes." He frequently regaled readers of the column with the hilarious adventures of Luke Guppy and Elmo Cooter, two characters who were forever getting themselves into unlikely scrapes. For many years, virtually all the full-color magazine covers were painted by Duane, who is widely regarded as one of the best wildlife artists in the country (he's still painting actively). It was a particular pleasure to work for Duane until his retirement in 1979, not only because of his self-effacing kindness, but also because it was a rare day that he did not inflict some awful pun on us.

"Producing a magazine is like making Brunswick stew—it's a messy process with no clear recipe."

All the interior photos and artwork that accompanied articles were black and white until the late 1970s when our new education division chief, Sid Baynes, launched an initiative to upgrade the publication. He hired our first art director, David Williams, to design layouts, and full-color photography began to appear with many of the articles. In addition to staff photographers Jim Lee, Jack Dermid and Joel Arrington, nationally known photographers were featured regularly, including Leonard Lee Rue III, Karl Maslowski, Bill Lea and Eugene Hester.

Readers have always anticipated regular articles about fish and game management, habitat, research, and hunting and fishing. But this mix has also always included natural history. Through the 1960s, Raleigh naturalist and author Charlotte Hilton Green was a popular contributor, writing numerous articles about birds. Beginning in the '70s, Doug Elliott fascinated readers with whimsical revelations about ginseng, old-time apples and possums. In the '80s, wonderful close-up photos of salamanders, insects and other species began to arrive from a previously unknown photographer from Spruce Pine named Harry Ellis. Oddly, the literate and accurate articles that accompanied those exquisite photos were written in longhand.

Harry was a frequent subject of speculation for Larry Earley, then associate editor (later editor), and me. We guessed that Harry must be a retired professor from up North, but a phone call quickly set us straight. Harry was a true intellect all right, but he was mountain homegrown and self-taught, and his gentle speech was full of "h'its" and "you'uns." Elizabeth Hunter interviewed Harry in the August 1997 issue.

Readers have seen the magazine undergo many changes through the years, and change always tends to elicit mixed reviews. Producing a magazine is like making Brunswick stew—it's a messy process with no clear recipe, and you keep adjusting the ingredients and hope it's going to turn out OK. The present staff members under editor Margaret Martin continue this tradition, and one measure of their success is that *Wildlife in North Carolina* is consistently one of the top two or three national award-winners every year.

This past September, the Wildlife Commission moved its main offices from the Archdale Building in Raleigh to its own handsome new building on the Centennial Campus of N.C. State University (you can get the address, new phone directory and other info from the agency's Web site at www.ncwildlife.org). Among other things, this latest move consolidates many of the agency's services in one building, which will be convenient for those who can now buy licenses, register boats, subscribe to the magazine and visit the various departments all in one stop. The building has been designed as a state-of-the-art example of environmentally friendly architecture, and once everything is completed, there will be permanent wildlife displays and wildlife and environmental workshops.

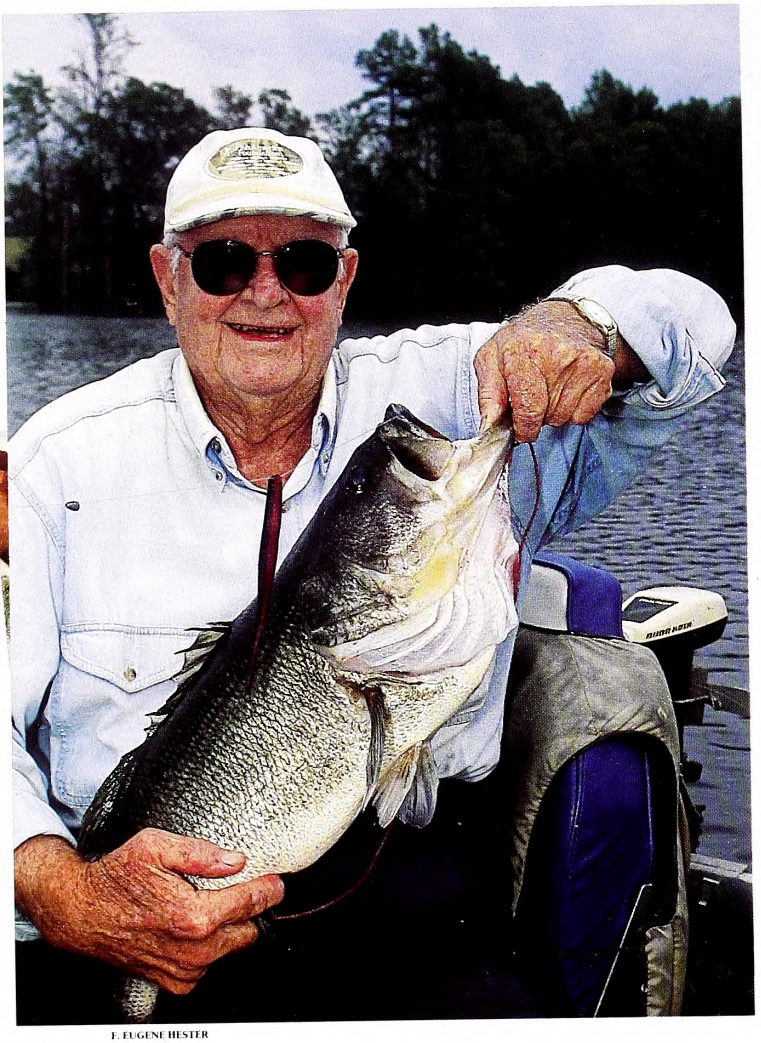
Truly, things have changed greatly since the agency's headquarters occupied the cramped top floor of a small Colonial grocery store off Glenwood Avenue all those years ago. But one thing hasn't changed. It pleases me to note that the desks of today's busy magazine editors, writers and graphic designers are just as messy as ours ever were.

N.C. STATE ARCHIVES

OUTDOOR MOMENT

Siler City, 1959

IN THE APRIL ISSUE



F. EUGENE HESTER

UNCLE BILLY'S BASS

Avuncular advice is worth heeding from a fisherman who's spent a lifetime in pursuit of big bass.

MISUNDERSTOOD SKINKS

None of the state's five different skink species are poisonous or even remotely dangerous. In fact, they're downright lovable.

PULL OF THE SIDE-BY-SIDE

The double gun is prized by discriminating wingshooters who compete at events designed for the classic firearm.

FIND US ON THE WEB AT ncwildlife.org

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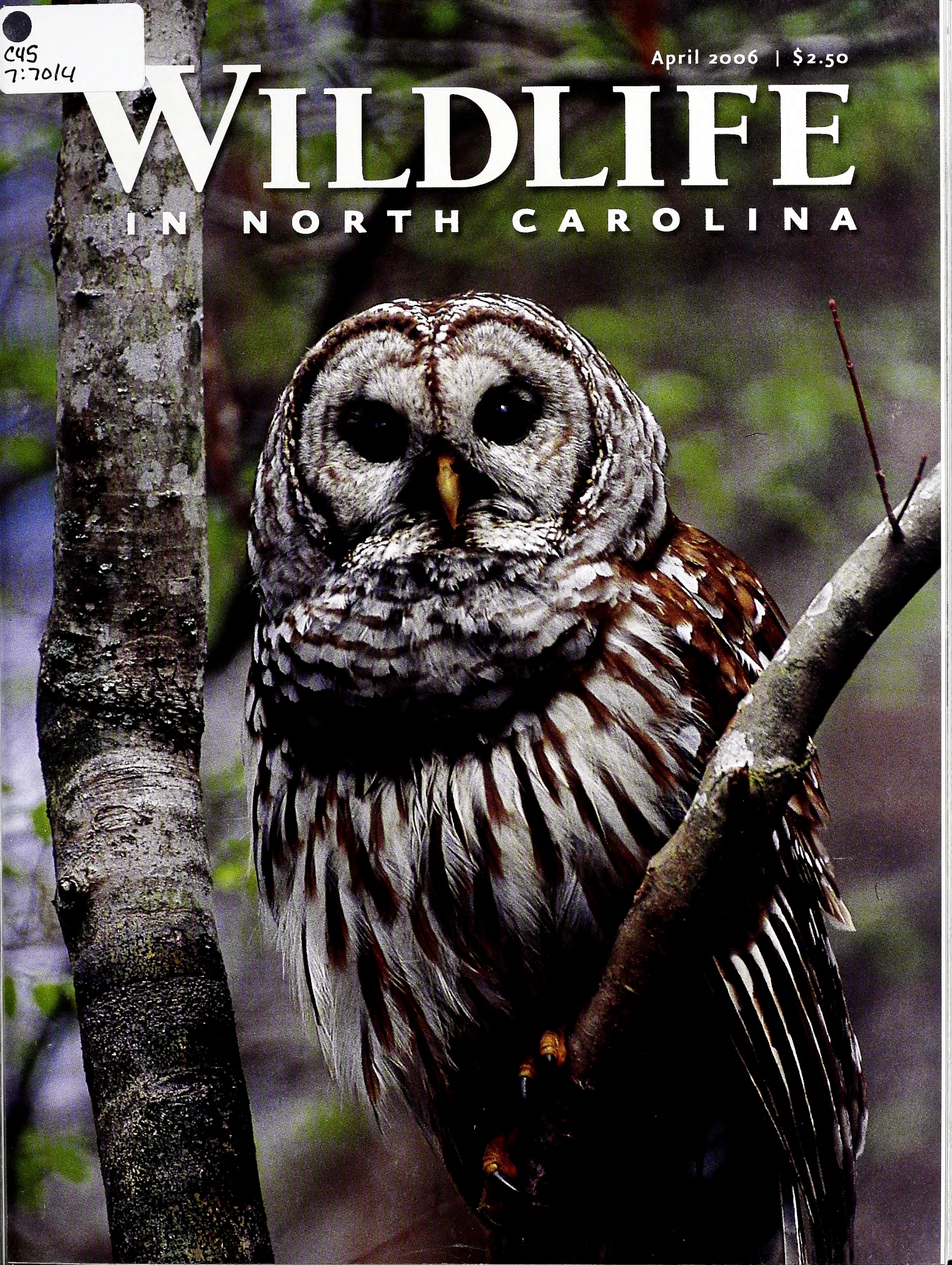
WILDLIFE IN NORTH CAROLINA



Side-by-side shotguns are not only functional, but also represent the epitome of the gun-maker's art. This tradition is continued in this modern-day Ansley H. Fox FE in 16 gauge. **PHOTOGRAPH BY MELISSA MCGAW.**

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Cover: Barred owls are among the distinctive creatures often found in North Carolina blackwater creeks. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Two stories this month honor North Carolina's sporting heritage. Bill Hinnant ("Uncle Billy, Bass Master," page 28) personifies the dedication and skill of thousands of anglers who've spent a lifetime studying the state's largemouth bass population. Such folks are usually generous with their hard-earned knowledge; Bill and author Eugene Hester treated *WINC* staff to a tour around their favorite fishing hole last spring about this time. In this story Bill shares some techniques and tackle that have served him well.

A well-used shotgun handed down in his family inspired staff editor Jim Wilson to delve into the culture of double-barreled shotguns ("Side-by-Side Seduction," page 20). Jim grew up in Granville County, where such firearms were trusted to help supply the family table with quail, rabbits, squirrels and ducks.

Beyond its importance to family and community, our sporting heritage is the bedrock of wildlife conservation in the state. Dollars spent on licenses, gear and donations to the Wildlife Endowment Fund are invested in wildlife habitat. Managing lands for wildlife benefits everyone—the wildlife watcher, the sportsman, the child of the future who will thrill to the sight of a bird that could have become extinct.

Proceeds from the sale of the N.C. Waterfowl Stamp and Print go directly to the commission's Waterfowl Fund. Whether you hunt or not, buying the stamp or print is something you can do to save habitat for waterfowl and all wildlife that inhabit wetlands on state game lands. This year's print by Gerald Putt features Gull Rock Game Land, a popular wintering spot for waterfowl on the Pamlico Sound. The artwork is the last in a series of five paintings that depicts waterfowl hunting traditions on the commission's game lands and impoundments. Call 1-866-945-3746 or visit www.ncwildlife.org for more information—the 2006 print will be available July 1.

I am pleased to announce that Greg Jenkins will occupy this spot next month. Also raised in Granville County, Greg is an award-winning writer and managing editor of this magazine and is well versed in wildlife management and our sporting traditions. I will be moving on to coordinate the commission's conservation efforts across the state at wildlife centers in the mountains near Brevard, on the Outer Banks at Corolla, and in Raleigh at N.C. State University's Centennial Campus.

Margaret Martin

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WILDLIFE IN NORTH CAROLINA

APRIL 2006 VOLUME 70, NUMBER 4

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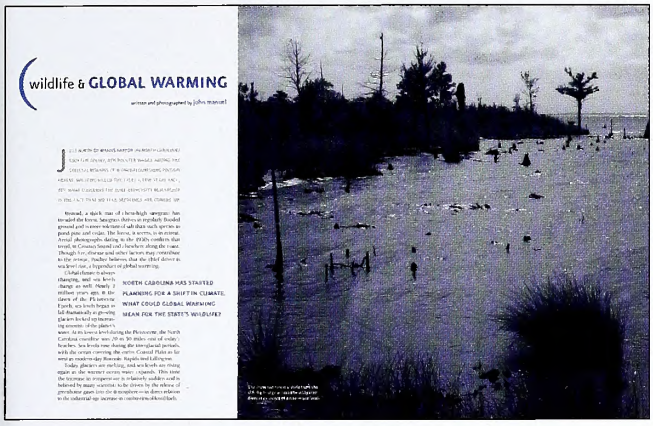


Global Concerns

After reading the February issue, I had some questions about the current alarming issue of global warming ("Wildlife and Global Warming"). I read in the past that coal-powered electric plants do more damage than automobile exhaust fumes and contribute more to global warming than anything else. If this is true, why haven't our state and the federal governments found alternative sources for electrical power? There are several coal-powered electrical plants near the Great Smoky Mountains National Park. Why do these plants continue to contaminate our atmosphere?

I enjoy fly-fishing for mountain trout and would hate to see our native brook trout, and their cousins the rainbow and brown trout, exterminated by warming waters and acid rain. I understand hydroelectricity may be unpopular with some sportsmen that enjoy catching migratory fish. Certainly it is unpopular with landowners who are forced to sell property that would be flooded upon completion of a hydroelectric dam.

What choice do we have? Clean air should be an accomplishment of industry, not an afterthought. Please continue to report on global warming. I am not a Sierra Club or Greenpeace member, just a concerned sportsman.

David Gaines
Jacksonville

I read your article about the effects of global warming on the state and how the N.C. General Assembly had passed the Global Warming Act. I was glad that act was passed, but I don't think that a committee whose charge is to "consider potential impacts" and "evaluate recommendations" will do any good. I heard that the Greenland ice cap is melting and will dump one-fifth of the world's fresh water into the Atlantic over the next few years if the CO_2 in the atmosphere isn't reduced immediately.

Today I went to RDU airport and saw more strip malls being built, and loads of huge new homes in semi-wooded lots set far apart. I saw miles of paved roads with wide, lifeless, grassy medians, and I saw more and more people driving more and more cars from one store to the next. I sat at a stoplight, looked at the car in front and wondered if anyone inside had heard of climate change, rising sea levels and habitat loss. If they had, did they know what they could do to help stop it; and if they did know what they could do, would they?

I decided, no, most people out there don't know, most people don't want to know and no one is going to do anything. Ignoring the signs of global warming and doing nothing is like saying "there is no threat from terrorism and people with box cutters can board planes" on Sept. 10, 2001. My friends, the plane is taxiing for takeoff: What are you going to do?

William Ryall
Oxford

Equal Time

I enjoy the "On Patrol" feature about game wardens each month. Here is a story about "restocking" a lake: A gentleman from the country was leaving a lake with a cooler full of fish when he was stopped by a game warden. "Do you have a fishing license?" the officer asked. "Naw, sir, I don't," the rural man responded. "But you must understand that these are my pet fish."

"Pet fish?" asked the game warden dubiously. "That's right," the angler said. "Every afternoon I take these here fish down to the lake and let them swim around for a while. Then I whistle for them, and they jump right back in this cooler."

"That's a bunch of hooey. Fish can't do that," said the officer. "These fish can," the fellow replied. "I'll show you. They are smart."

"OK," said the warden. "I've got to see this." So the man poured the fish from the cooler into the lake, and they promptly disappeared. Both men stood there for several minutes until the officer turned to the angler and said, "Well?"

"Well what?" asked the fellow. "When are you going to call the fish back?" demanded the officer.

"What fish?" shrugged the angler.

Harold L. King
Troutville, Va.

Fear the Oink?

The article on wild pigs entitled "Hog Wild" by Mark Jones (Feb. 2006) did not address a question that people often ask: Are wild pigs ever dangerous? If I am trout fishing deep in the Smokies and meet some of them on a narrow trail, need I be concerned?

Joe McDonald
Hoffman

Mark Jones, bear biologist, N.C. Wildlife Resources Commission: Most wild animals, including wild hogs, can be dangerous and should not be approached or harassed. Attacks by wild hogs are very rare but have occurred in cases where the animals felt cornered, and sows can be protective of piglets. The best advice for anyone encountering a wild hog would be to slowly leave the area and not give the animal any reason to feel threatened. As long as discretion and common sense are used, most outdoor enthusiasts have more to fear from their drive to the woods than from a wild hog.

No Road, No Way

Forget the "Road to Nowhere" (Feb. 2006). If you build it, they will come! Please allow your ancestors to rest in their beautiful site, and take as many healthy excursions to visit them that you can.

Andrew Petitt
Bladenboro

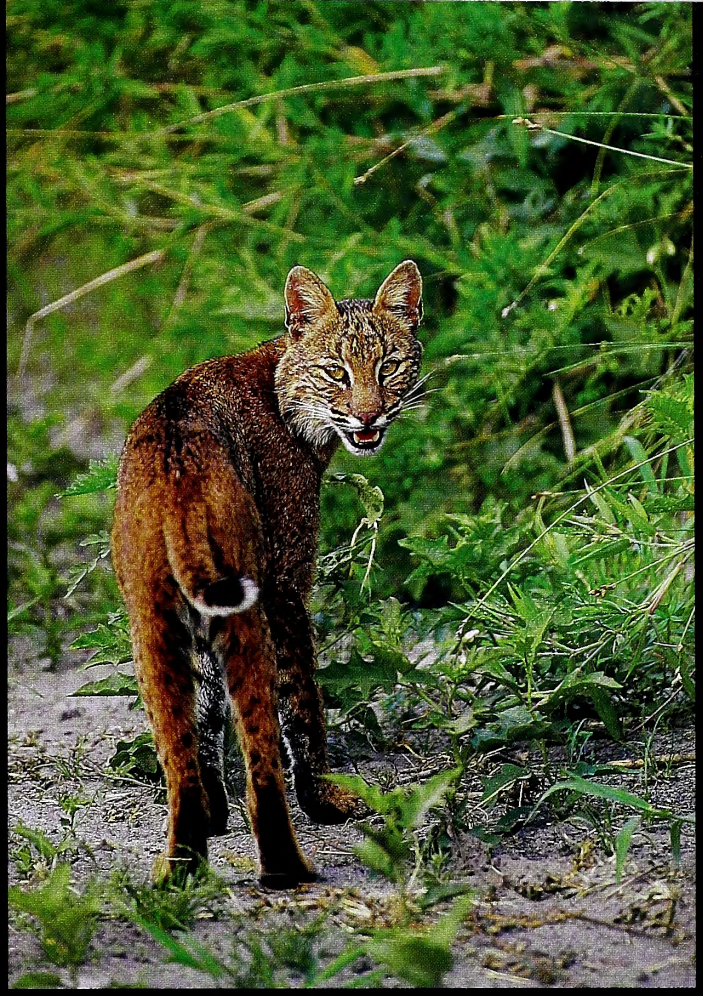
write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

Creatures of Blackwater

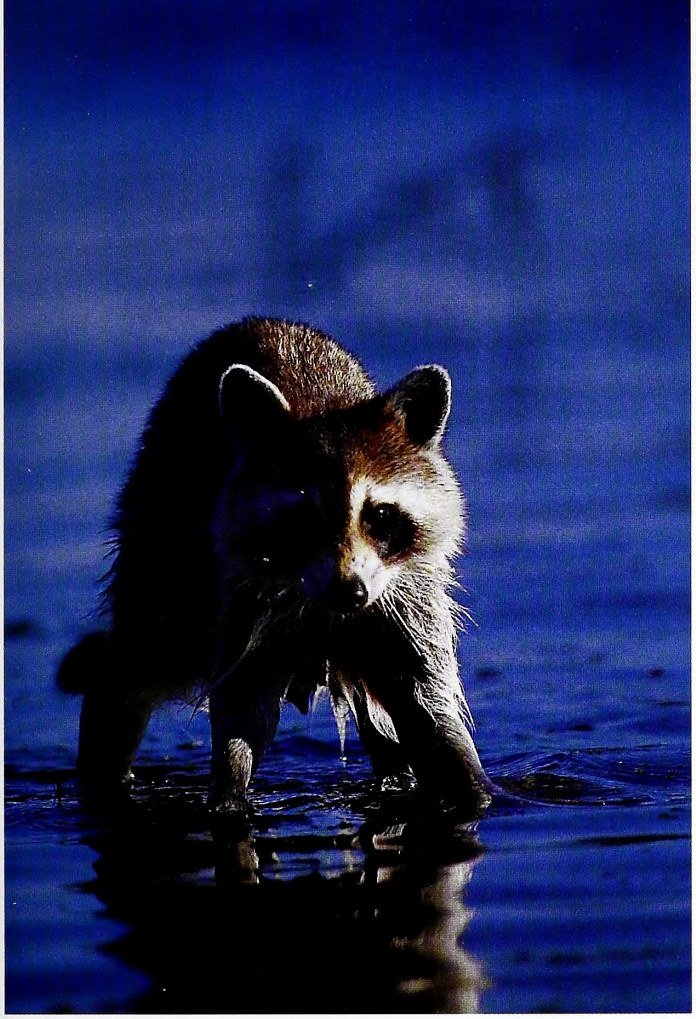
These animals are worth seeking out in our southeastern swamplands.

HIKE ALONG A BLACKWATER STREAM IN A BOTTOMLAND FOREST, AND YOUR SENSES CAN BE OVERWHELMED. THE MUSKY SMELL OF DECOMPOSING PLANT MATTER FILLS THE AIR. RIVER OTTERS SPLASH IN THE TEA-COLORED WATER. THE CLEAR CALL AND RESPONSE OF BARRED OWLS ECHOES THROUGH THE TREES. TURN OVER A ROTTING LOG, AND YOU MIGHT UNCOVER A MARBLED SALAMANDER OR A CENTIPEDE GUARDING HER EGGS. IF YOU ARE VERY LUCKY, YOU COULD SPOT A BOBCAT MOVING STEALTHILY THROUGH THE FOREST. IN LATE SPRING AND SUMMER, THE GOLDEN FLASH OF A PROTHONOTARY WARBLER CATCHES YOUR EYE AS IT FLITS FROM TREE TO TREE. A WHITE-EYED VIREO SITS QUIETLY IN ITS CUP-SHAPED NEST WOVEN FROM FINE GRASSES AND OTHER PLANT MATERIALS. TUPELO GUM TREES AND BALD CYPRESS TREES, SOME MORE THAN 1,500 YEARS OLD, LINE THE EDGE OF THE MEANDERING STREAM. AS YOU WALK, YOU GET THE EERIE FEELING YOU HAVE STEPPED INTO A LOST WORLD WHERE MYSTERIOUS CREATURES ABOUND.



WRITTEN AND PHOTOGRAPHED **BY TODD PUSSER**

BLACKWATER STREAMS FEED THE MAJOR COASTAL PLAIN RIVERS OF SOUTHEASTERN NORTH CAROLINA. THE SLOW-MOVING WATER IN THESE STREAMS IS STAINED BY TANNINS, ACIDIC BYPRODUCTS OF THE DECAY OF MILLIONS OF FALLEN LEAVES AND OTHER ORGANIC MATTER. THE REGION'S DARK STREAMS AND LOW-LYING FORESTS ARE HOME TO A DIVERSE ARRAY OF ANIMALS. SOME, LIKE THE TWO-TOED AMPHIUMA AND STAR-NOSED MOLE, ARE SO BIZARRE LOOKING THEY APPEAR TO HAVE STEPPED RIGHT OUT OF THE LATEST SCIENCE FICTION MOVIE. THIS COLLECTION OF PHOTOS HIGHLIGHTS JUST A FEW OF THE ANIMALS FOUND ALONG THE BLACKWATER CREEKS OF NORTH CAROLINA.



RACCOONS FORAGE FOR MUSSELS, CRAYFISH AND MANY OTHER TYPES OF FOOD IN BLACKWATER STREAMS SUCH AS DROWNING CREEK. THE HABITAT IS HOME TO THE EASTERN COTTONMOUTH, WHICH CAN BE SEEN SUNNING ITSELF OR SWIMMING WITH ITS HEAD HELD HIGH ABOVE THE WATER.

Just add water

FLY-TYING RECIPES ARE EASY TO COOK UP. THERE ARE MANY REASONS WHY CREATING YOUR OWN FLIES IS MORE FUN AND PRACTICAL THAN BUYING THEM FROM A SHOP.

When I was a kid, my grandfather introduced me to fly-fishing. To him, it was equal parts sport and food gathering—relaxation with a purpose. Thus, he hedged his bets. He used wet flies, variously imitating immature or drowned insects, small minnows and similar food items. But not trusting in visual subterfuge alone, Granddad tipped the flies with "stick bait"—caddis larvae found in virtually all North Carolina trout streams. Once widely practiced, "sweetening" a fly isn't common today and would almost certainly be rewarded with a citation or at least a stern lecture if practiced in fly-only waters.

The color, the subtlety and the elegant proportions of Granddad's flies fascinated me. My grandfather didn't tie them, and he explained their origin only as feathers and stuff. The "how" didn't really interest him, but it did me. When I was old enough to read about it in a book, one with overly simplistic line drawings, the basics were difficult to grasp. Without the tools and feathers, actually tying a fly was still some time away for me.

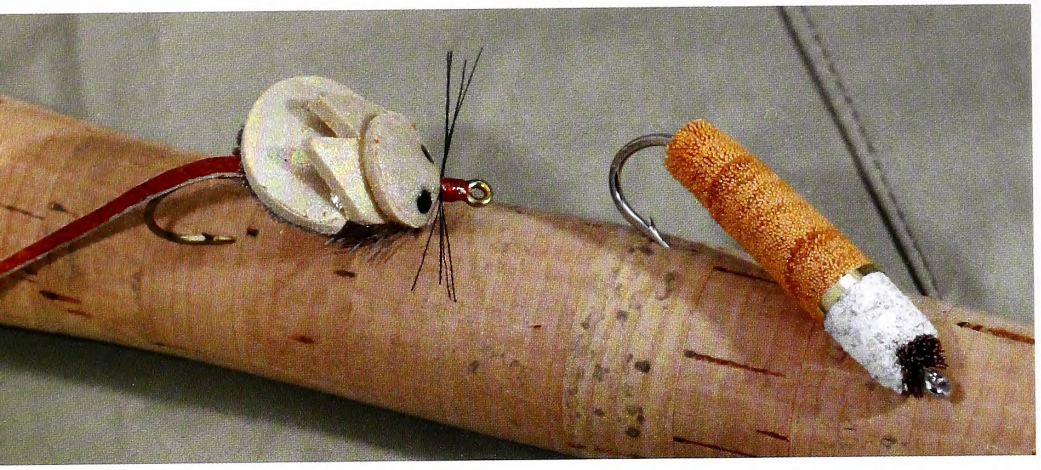
Years later, I bought a tying kit at the local "fly shop," a Western Auto that had a reasonably good selection of fly tackle for a small mountain town. The kit's instructions were shoddy, but at least my learning was hands-on. Charitably, though, those early efforts were reminiscent of a grasshopper that recently met a windshield moving at the speed limit.

Fly-tying used to be like that. Unless you had an experienced mentor, learning to tie was a hit-or-miss process: frustrating, prone to failure and, in most cases, yielding inelegant results. Thanks to the many learning venues now available, getting a bit of instruction and a few basic techniques under your belt is easy. Learning to tie flies no longer has to be a painful experience. If you have moved beyond Velcro to laces for keeping your shoes on, you're plenty ready to delve into fly-tying.

NO LONGER SNOBBISH OR MYSTERIOUS

It's a shame that fly-tying is still often viewed as too complicated, too elitist, too "troutish." Fly-tying is, in fact, much like fly-casting. To the uninitiated, both seem difficult. Once understood, the basics of each seem rather simple. And yet both offer sufficient subtleties and complexities to provide a lifetime of study, growth and enjoyment.

WRITTEN AND PHOTOGRAPHED BY BUZZ BRYSON



Page 8: Doug Sinclair shows a bass bug he made by tying deer hair and trimming it with a razor blade. Page 9: The Atlantic salmon fly is unsurpassed in beauty. Above: There is plenty of room for humor and creativity in fly-tying, as evidenced by these novelty flies and imitation bugs. Below: Flies such as the Clouser minnow, with its prominent lead "dumbbell" eyes, are deadly on striped bass.

Why bother learning to tie, some might ask, when high-quality commercially tied flies are widely available? Well, some anglers get interested in fly-tying for purely economic reasons. Leaving flies dangling from streamside rhododendrons is just like hanging dollar bills there. The thought of tying one's own flies sounds like a great way to save some money. Others, becoming a bit bored over a long winter and getting antsy waiting for spring, start tying to stay connected to their favorite sport. Many anglers are naturalists, studying not just the fish but also the seasons of the stream, its flows and temperatures, and the foods the fish eat. And some, well, they just want to be able to answer the question "How do they do that?" Whatever the motivation, fly-tying has long been a pastime both part of and essentially equal to fly-fishing itself.

Tying was once much more mysterious than it is now. Decades ago, some of the early practitioners tightly held their techniques, passing them on only to a select few, if at all. Today, fly-tying is big business: Dealers often stock as many or even more tying materials as they do finished flies. Shelves are lined with books on how to tie, on tying patterns (commonly known as "recipes"), on insects and how to imitate them, and more. And then there are the instructional videos, which are the next best thing to hands-on instruction.

First, let's dispel the notion that tying is too complicated. Some of the most effective patterns are the simplest and easiest to tie. The pheasant tail nymph, a classic trout fly, was designed to be tied with a few strands of pheasant tail barbs. A short length of brass wire adds a bit of weight and serves as the "thread" that holds the fly together. The woolly worm, looking just like the fuzzy caterpillar its name suggests, has only two materials: a simple chenille body and a feather wound around that body and secured by thread. Both patterns can be deadly not only for trout, but also for sunfish and, believe it or not, carp—a species many are finding offers outstanding fun on a fly rod.

At the other extreme, 19th-century British salmon anglers turned fly-tying into both an art form and a complicated exercise, concocting flies from the most exotic feathers that could be gathered by the farthest reaches of British explorers. Recipes for some of these flies contained as many as a dozen or more different materials, requiring fur, feathers and tinsel to be applied in an orderly sequence and with rigidly set proportions. Tying a "full dress" feather-wing Atlantic salmon fly was both tedious and time-consuming. Although these flies were clearly no more than artistic endeavors (the Atlantic salmon seldom eats while on its spawning run up freshwater rivers), they certainly could serve to while away a long winter and heighten expectations for the coming season. More businesslike salmon anglers substituted hair for the feathers, making the flies more durable and both quicker and easier to tie.

Yet both are a far cry from the humble and scruffy-looking pheasant tail nymph, which can be tied in only a minute or two, and which is a staple fish-catcher in almost every angler's fly vest.

WHERE AND HOW TO GET STARTED

Fly-tying isn't rocket science. You can learn it from a book or a DVD. However, there is no better way to learn to tie flies than from

a good instructor. They're usually easy to find through local Trout Unlimited chapters. There are 15 active chapters and more than 2,000 members in North Carolina; visit www.nctu.org to find the nearest one. Many of the members also fish for species other than trout, and they're willing to share their knowledge on basic tying and which flies work best for each species.

Fly shops are an obvious place to look for instruction, and they're found from the mountains to the coast. Although many shop-provided tying courses do involve a fee, the cost is usually modest. Such courses can quickly provide basic information on technique, as well as equipment needed to get started.

The tools needed for tying are few and relatively simple. A starter setup consists of a vise that holds the hook (when tying becomes an obsession, some spell this "vice"), scissors, a bobbin to hold thread, hackle pliers to hold feathers while wrapping them around the hook, and a sharp needle called a bodkin. Kits containing the basic tools and more are available, but it's usually just as easy to select them individually. Other common tools are a whip finisher used to tie a neat locking knot in the thread at the completion of tying the fly, a small container of head cement to better seal the tied-off thread and, most important, a good lamp that puts out plenty of light.

Getting started need not be too expensive. Basic tools and enough material to tie a dozen or so each of several patterns can be bought for about $100. As with many hobbies, there is a significant range in prices of tools. Higher prices don't necessarily mean better tools. Price variations can reflect quality, but they can also be the result of specialized functions that may not be needed by some. Shop wisely.

There is virtually no limit to the size of flies such as this large streamer, shown beside a nickel for scale. A closer look at the nickel shows a nymph (bottom) and dry fly, both tied on tiny size 28 hooks.

TYING WITH GOOD INGREDIENTS

What does fly-tying have in common with cooking? Well, the best dishes start with good recipes using quality ingredients. Traditionally, materials for fly-tying recipes have been natural furs, feathers and fabric yarns. After all, only natural ingredients were available a century ago. Fly patterns commonly were tied

GETTING STARTED: Basic tools for tying flies

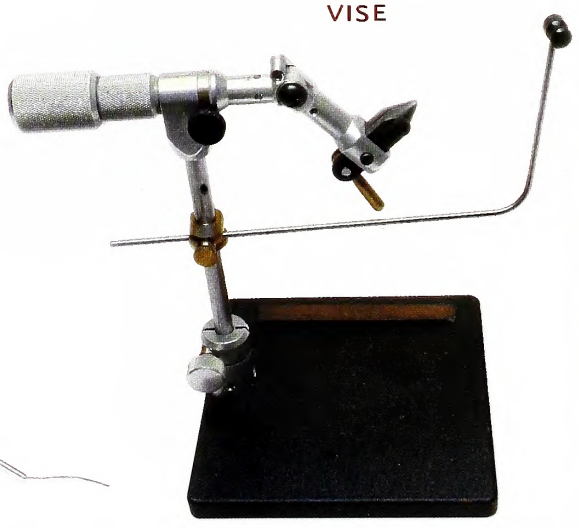
WHIP FINISHER

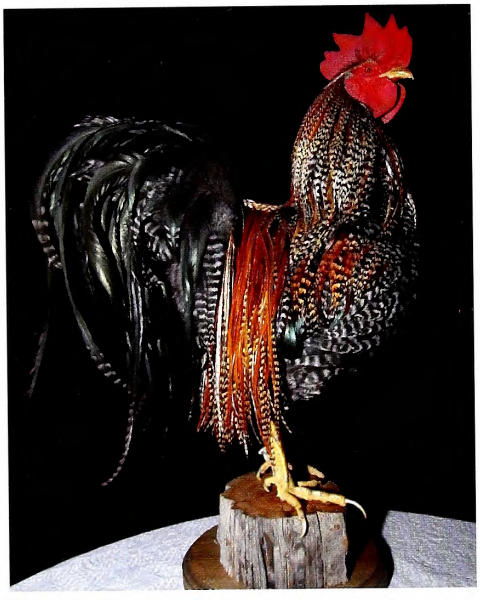
HACKLE PLIERS

SCISSORS

THREAD AND TYING BOBBIN

VISE





Fly-tying can be a social activity and a learning experience when combined with a group of friends. Geneticists have bred fowl such as this rooster for its showy feathers which are used in creating fishing flies.

with dyed wool yarn and feathers from barnyard fowl. Soon, feathers from various waterfowl, pheasants, grouse, starlings and other birds, and hair from rabbits, deer, squirrels, beavers and other animals, became commonly used, and they still are today.

As interest in the sport grew, tiers sought out better materials. One example is the search for feathers that "behaved" better when wrapped on a hook. Dry-fly anglers like for their flies to float well. One way to achieve that is with a fly that incorporates hackle that is stiff enough to support the hook and other materials, is uniform in length, and wraps well around the hook shank without twisting or adding excess bulk. Variations in feathers are endless, and anglers sought out those of finest quality. Quality was hit or miss for a long time. But just as Gregor Mendel's writings on his observations of heredity characteristics led the way to better corn, beef and chickens, so did geneticists turn to raising poultry better suited for tying flies. Today, feathers are specially selected and grown for various fly-tying purposes. As one example of the extremes to which the hobby can be taken, consider again the Atlantic salmon fly. For centuries, the British have considered fly-fishing for Atlantic salmon to be the pinnacle of angling. In their world travels, Brits collected an amazing variety of exotic fur and feathers, and they tried to outdo one another in fashioning the most complex and colorful flies. Many of those feathers come from species that are threatened or endangered today, but tiers have continued the art of "dressing" these exquisite patterns by substituting other similar-looking materials. Not constrained by the need to imitate nature, these patterns represent only the artistry of the fly-tier.

When some species used for materials were identified as threatened or endangered and tiers (aside from hardcore traditionalists) sought substitute materials, they began to incorporate synthetics creatively. Now, finding and effectively using new materials and techniques is part of the fun of tying.

Synthetics include natural-looking "hair" in a broad array of lengths, diameters and stiffnesses, and in just about any color imaginable, from subtle earth tones to electric neon colors. There are rubber "legs" used to give patterns more life and action like bass lures have. Various mylar "flash" materials have become very popular. Eyes are useful, too, from dumbbell lead eyes used on fast-sinking patterns to plastic eyes for floating or slow-sinking flies, and even doll eyes found at craft stores. In fact, craft stores have

become regular stops for many tiers, who have found a treasure trove of ingredients for recipes. Craft fur makes great wings for small streamer and saltwater flies. These stores stock many types of glues, paints and sparkle material as well.

Fabric stores also can be good sources of material. I discovered that some even sell feather boas. These half-scarf, half-rope accessories (think flappers from the 1920s) are made by sewing marabou feathers onto a strand of cotton rope. Marabou is used in many fly patterns, and it shimmies with the slightest movement in the water. One boa costs only a few bucks and provides enough marabou to tie hundreds of flies. Hardware and electric supply stores are handy, too. Lead wire, sold there as fuse wire, is wrapped on the hook shank under other materials to add unseen weight to the fly for situations where fish aren't near the surface. In fact, in combination with readily available fast-sinking fly lines, such materials have allowed fly fishers to extend their effective fishing range dozens of feet below the surface in many cases.

Fly-fishing and fly-tying are rooted in trout fishing. But no one has ever suggested that either should be so limited, and anglers and tiers have gone far beyond those origins. Bluegill and other sunfish, largemouth bass and striped bass are great fun on flies. In salt water, gray and speckled trout, redfish, Spanish and king mackerel, tarpon, tuna and billfish are regularly pursued on flies.

In fact, the false albacore has put North Carolina on the map in the fall for many fly-fishing fanatics across the country. The "Fat Albert" as it's commonly called, was largely considered a trash fish (trust me, it is not on the menu at any seafood restaurant) until it was discovered to eat flies readily. Although it is easily caught on small metal plugs, of the dozens of boats I have seen fishing for albies at Cape Lookout on any given day, probably more than 90 percent of them carried anglers using fly tackle. Flies are that effective.

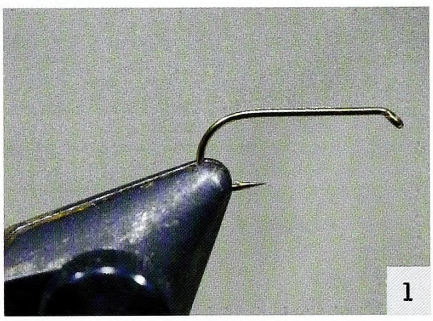
Whether it is a native speckled trout from a tiny headwaters stream or a big red drum cruising a shallow bank at the coast, catching it on a fly that you've tied yourself adds an extra measure of satisfaction. ◆

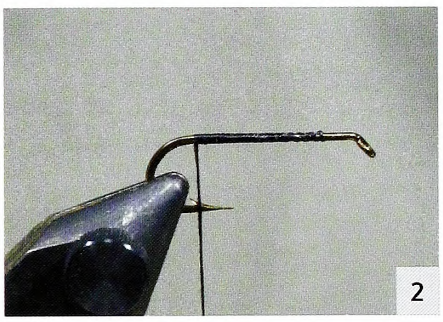
Buzz Bryson is a Cary environmental scientist, an accomplished photographer and a contributing editor to Fly Rod & Reel *magazine.*

GIVE TYING A TRY

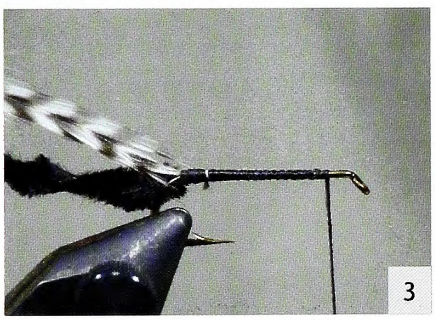
Basic fly-tying is simple, and the classic woolly worm pattern is a great example. This easy-to-tie, buggy-looking fly is a deceptively effective fish catcher. There are only a couple of ingredients other than the hook, thread and tying tools. The woolly worm is tied with black chenille and a grizzly hackle feather on a hook with a moderately long shank. Below are the bare-bones basics, but a few modifications can change the look of the fly significantly. Change the body to flash and it's a crystal bugger. Add a tail of marabou feathers and it's a woolly bugger. Add rubber legs and it's a girdle bug.

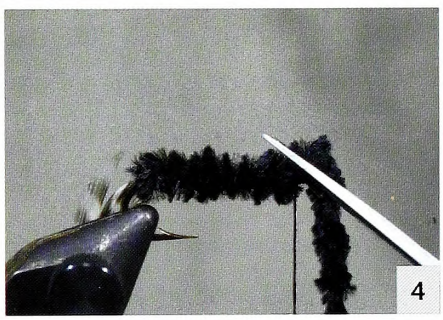
BASIC INGREDIENTS



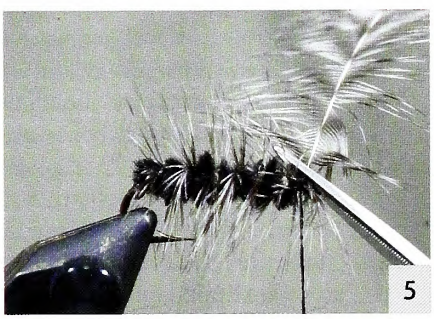


1) Place hook in vise. 2) Wrap the thread from near the front of the hook back to near the bend.





3) At the bend of the hook, tie in the end of the chenille and the tip of the hackle, and wrap the thread back to the eye of the hook. 4) Wrap the chenille forward, fully covering the hook shank, and securing it at the hook eye with additional thread wraps. Snip off the end.



5) Wrap the hackle forward in wide spirals and secure it at the hook eye with thread wraps. 6) Knot the thread, clip it off and go fishing. From the fish's viewpoint, it could be a caterpillar, a hellgrammite or large stoney nymph—certainly buggy enough to make a fish take a bite.

TODD PUSSER

Let us do justice to the skink
Who isn't what so many think.
On consultation with a wizard
I find the skink a kind of lizard.
Since he is not a printer's whim,
Don't sniff and back away from him,
Or you may be adjudged too drunk
To tell a lizard from a skunk.

—Ogden Nash

Many common, widespread, conspicuous animals remain poorly understood by the average person. I'm frequently reminded of this when presented with such queries as, "What's the difference between a skink and a lizard?" or "What are those salamanders I see on my barn?" My own introduction to skinks came from my grandmother, who knew them as "scorpions" and warned me that they were poisonous. But being a skeptical child, fond of perusing books and pursuing small creatures, I was soon handling skinks with impunity and helping Grandma unlearn decades of folklore.

Skinks are lizards—a particular group of lizards. They form the large, cosmopolitan family Scincidae, which includes approximately 1,000 species, with some on every continent except Antarctica. North Carolina's five species comprise more than 40 percent of its lizard fauna. Skinks differ from other lizards in several (mostly internal) anatomical features. Most have shiny, armorlike scales reinforced with underlying bony plates called osteoderms. The legless glass lizards ("Glass Lizard Tales," Feb. 2003) are North Carolina's only other lizards with these features.

LOVE SKINKS

Get to know the skinks — perhaps the state's most common and most misunderstood group of lizards — and you might find a new favorite reptile.

written by Jeff Beane

Three of our five skinks closely resemble one another. As juveniles, all three have bright blue tails and five longitudinal yellowish, whitish or orange stripes. These colors and patterns fade with age, often disappearing altogether in old males. Most familiar is the five-lined skink, *Eumeces fasciatus*. Found over much of the state, it is most common in the Piedmont, where it utilizes a variety of habitats, especially favoring open areas in or near deciduous or mixed forests. It also occurs below 4,000 feet elevation in the Mountains, and is spottily distributed in the Coastal Plain, where it prefers river bottoms and other hardwood areas. Five-lined skinks are excellent climbers, but are equally at home on the ground.

More common in the Coastal Plain is the Southeastern five-lined skink, *Eumeces inexpectatus*. Preferring sandhills, pine flatwoods, savannas, pocosins, barrier islands and salt marshes, it replaces the five-lined skink in many such habitats, though it also occurs in many Piedmont localities. More terrestrial than the other two five-lined species, it often hides beneath surface debris or beneath loose bark on logs or stumps.

The broadhead skink, *Eumeces laticeps*, is our largest and most arboreal skink. Reaching a foot in total length, it is North Carolina's largest lizard other than the three legless glass lizards. Mature male broadheads lose their stripes, resulting in shiny bronze lizards with bright red or orange heads. Fast and wary, they are especially difficult to capture or closely approach. The jaws of large adults are strong enough to inflict a painful but harmless pinch. The spreading, moss-

The five-lined is our state's most familiar skink, occurring in a variety of habitats but mainly concentrated in the Piedmont. The juvenile at left loses its blue tail and its stripes begin to fade a bit when it matures into an adult (below).

PARIS TRAIL

TODD PUSSER

JACK DERMID

The broadhead skink can be difficult to identify. Top right: An immature broadhead looks a lot like a five-lined or a Southeastern five-lined. Top left: The adult male broadhead's size and head shape are quite distinctive, but the adult female (above) has a significantly different appearance. Lower left and center: The ground skink is one of the smallest reptiles in North America, maxing out at less than 6 inches.

festooned live oaks so characteristic of the Deep South frequently harbor these impressive reptiles.

Adult broadheads may be recognized by their size, but juveniles are easily confused with five-lined or Southeastern five-lined skinks. In areas where all three occur, the Southeastern may be identified by the middle row of scales beneath its tail. That scale row is about the same size as the other rows—in the other two species it is noticeably wider. Several other scale and pattern differences may be used to distinguish the three, but even experts sometimes have difficulty with them.

Our rarest and least familiar skink—the coal skink, *Eumeces anthracinus*—occurs at scattered localities in the Mountains. Like our other *Eumeces*, it has a bright blue tail when young, but is readily identified by the presence of only four stripes ("four-lined skink" is another common name in parts of its range). Smaller than the other *Eumeces*, its habits are generally similar, but details of its natural history and habitat requirements are poorly known.

Speed, secrecy and adaptability

Skinks mate in spring, and males exhibit territorial aggression toward each other during that time. Like all North Carolina lizards, skinks lay white, leathery-shelled eggs, usually in late spring or early summer. Clutch sizes range from two to 22. Eggs are usually deposited beneath a sheltering object such as a log or flat rock, but some individuals may nest above ground in tree cavities. Female *Eumeces* usually attend their eggs during incubation, defending them primarily from such small potential predators as crickets and ground beetles, but occasionally hanging tough against larger animals (more than one person has had a finger nipped while disturbing a skink nest). They also turn the eggs periodically—behavior which may deter fungal growth and/or prevent desiccation. The eggs absorb moisture and increase in size during the four- to six-week incubation period. After hatching in late summer, young skinks disperse, receiving no further parental care.

If you've ever heard a faint rustle in the leaves along a woodland path, chances are you walked by North Carolina's smallest reptile, and one of the smallest in North America—the ground skink, *Scincella lateralis*. Ground skinks inhabit most of our Coastal Plain and Piedmont, and also occur at scattered low elevations in the Mountains. These elfin lizards are highly terrestrial,

JACK DERMID

ALVIN BRASWELL

JACK DERMID

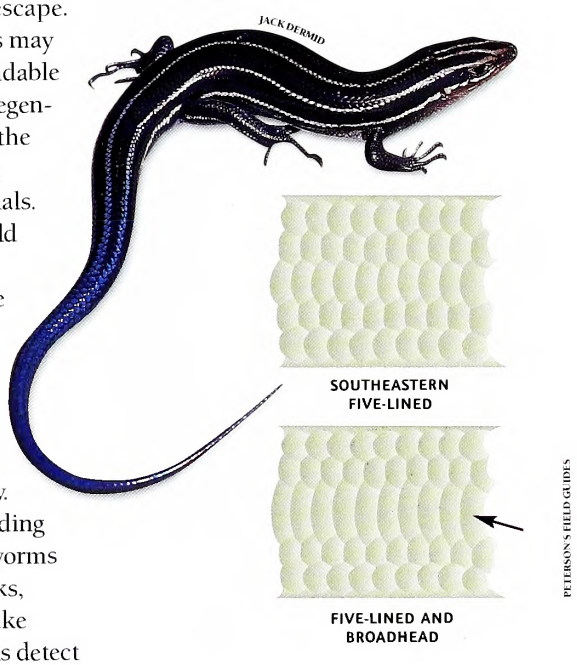
Left: The coal skink juvenile starts off with a blue tail, but the loss of that color is one of the few noticeable changes as it matures into adulthood (right).

living predominantly amid surface litter, and rarely climb. Slender with small legs, they have a shiny brown or bronze back with a dark stripe on each side and a white or yellowish belly. Transparent disks in their lower eyelids enable them to see with their eyes shut. Their small size means correspondingly small egg clutches—from one to six (usually two or three). Unlike *Eumeces*, ground skinks do not guard their eggs. Despite their relatively low reproductive output, and the fact that their size makes them vulnerable to a gauntlet of predators (even bluebirds are known to feed these tiny skinks to their young), they are often abundant.

Speed and secrecy form the front line of a skink's many defenses. Pursued, they quickly ascend trees, vanish into holes or crevices or take refuge beneath sheltering objects. They may even enter water to escape (I once caught a five-lined skink in a dip net in a flooded Carolina bay). Should the run-and-hide strategy fail, most individuals don't hesitate to bite, and their strong jaws may startle an attacker into releasing them. Their smooth, thick scales present difficulties for some predators—akin to eating a slick, wriggling, armored sausage. Tail autotomy is another trick—one employed by all our native lizards. If a predator seizes a skink's tail, fracture planes in the caudal vertebrae cause the tail to break easily—sometimes into several pieces. The broken tail will thrash vigorously for some time, potentially distracting the predator and allowing the lizard to escape. The bright blue color of skinks' tails may divert attention to these most expendable body parts. Broken tails eventually regenerate, but are shorter and paler than the originals. There is also evidence that *Eumeces* may taste bad to some animals. Their bright colors and patterns could represent warning coloration.

TODD PUSSER

Despite these defenses, skinks are eaten by numerous predators, with certain snakes and birds topping the list. Kingsnakes are especially fond of skinks, and the scarlet kingsnake specializes in eating them, though it also takes other prey. Skinks are themselves predators, feeding primarily on insects, spiders, earthworms and other invertebrates. Larger skinks, especially broadheads, may rarely take small vertebrates or bird eggs. Skinks detect most moving prey visually, but may also use chemical cues to identify food. A foraging skink may flick its tongue repeatedly, delivering chemosensory information to its vomeronasal organ, in the same fashion that snakes locate prey.



The scales on the underside of a skink's tail can aid in identification. The Southeastern five-lined (above) has a relatively uniform pattern, but the five-lined and broadhead have a wide middle row of scales.

TODD PLESSER

PARIS TRAIL

JEFF BEANE

Skinks such as this broadhead are often seen sunning on the trunks of trees. Five-lined skinks mate in spring, and the female guards the nest until the hatchlings emerge.

Skinks are adaptable lizards, and all but the coal skink are still common over much of our state. But like most wild creatures, they are threatened by human activities. Paved roads, house cats, pesticides and other human byproducts have completely eliminated them from some areas. But they still persist in some unlikely spots, including parts of downtown Raleigh, where railroad rights of way and vacant lots continue to provide habitat.

Worth watching — or wearing

Unlike many reptiles, but like many other lizards, skinks qualify as watchable wildlife. They're active, colorful, diurnal, conspicuous and exhibit interesting behaviors. Prime skink-watching spots include old buildings, stone walls, boardwalks, rock outcrops, woodpiles, fences, forest edges and woodland paths. Many of our state parks and recreational areas are good skink observatories. Warm, sunny days are best, and close-focusing binoculars are very helpful. For close encounters, surprise them under logs, flat rocks or other sheltering objects during early mornings or cool, cloudy weather. You'll still have to be quick to catch them, but never grab their tails — they'll need those as insurance against future predators.

Occasionally, one may still hear skinks referred to as "red-headed scorpions," but increasingly, people have come to appreciate these familiar lizards not only as beneficial insect eaters, but also as attractive, harmless, interesting backyard residents. There's little question that skinks are ecologically important — perhaps more so than we realize. But to those who bother to know them, they are more than that. My own experiences with them have been mostly simple ones, but they've been enough. At a former Wake County residence, a woodpile on my porch was home to a female five-lined who I could — with great care — trick into taking insects from my fingers. Southeasterns and broadheads also lived on the property, and I had all three turn up inside my mailbox at different times.

The morning after Hurricane Fran trashed that yard and just missed demolishing my home, one of the first things I saw was a tiny ground skink nonchalantly sunning in the flooded, tree-strewn aftermath. One evening as I sat on a friend's deck in Chowan County recording the day's reptile observations, a five-lined skink ran onto my open field notebook, as though demanding inclusion. I won't forget one big male broadhead I grabbed off a live oak at Orton Plantation during a wedding. I'd caught it to show a young boy who was interested, but the wedding

TODD PUSSER

photographer was also so interested that he included photos of it with the other wedding shots. On their anniversary, the couple returned to the site and later gave me a photo of a pair they saw together on the same tree.

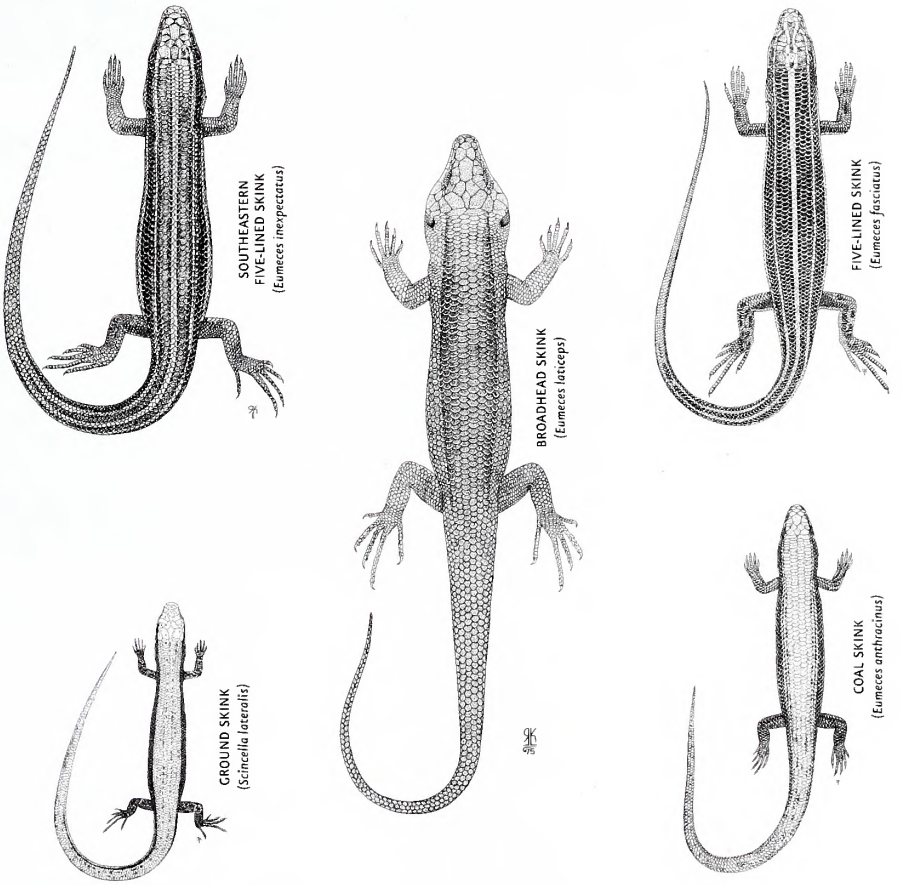
Neither will I forget modeling "skink earrings" for neighborhood kids. This involved persuading a skink to bite down on each earlobe and dangle there motionless for up to several seconds. Or the audacity of a female five-lined I watched raid a paper-wasp nest in a Randolph County chicken house, methodically extracting one succulent larva after another with impunity. Or the time I was carrying a juvenile Eastern kingsnake and a Southeastern five-lined skink to show a friend, when the snake began swallowing the skink in my hand as I walked. I held onto it just long enough to show my friend the narrow subcaudal scale row characteristic of that species, before relinquishing it to the snake.

If skinks are personalities to me, I'm not entirely alone. An 8-year-old recently told me the five-lined skink was her favorite animal. Indeed, many children enjoy catching skinks, but our native species don't make particularly good pets. They are best observed in the wild or as very short-term captives before being released back where they were found. Some of the world's other species make hardier captives, with blue-tongued skinks — hefty Australian species — being especially popular in the pet trade. Skinks also turn up in art and literature (beside silly poems). One of my all-time favorite T-shirt designs, from 1990's Festival for the Eno, depicted four five-lined skinks in a spiral pattern. And fans of crime novelist Carl Hiaasen revere the reclusive, road-kill-eating, tourist-hating, former Florida governor, "Skink," who appears in several of his most popular works.

Triteness notwithstanding, to know skinks is to love skinks. Witnessing the intensity of their mating and territorial skirmishes, the precision of a hatchling pursuing a jumping spider, the ferocity of a skink bashing a large centipede senseless against a log, and the strategic focus of a particularly hungry individual systematically dismembering a wolf spider until it hadn't a leg to stand on, may not have enabled me to think like a skink, but it has brought me closer to understanding life on a remarkable planet. No fleeting glimpse of stripes or blue tail has ever failed to weave improvement into the fabric of any day I've lived through. ◆

TODD PUSSER

Predators such as raptors and kingsnakes feast on abundant skinks.



A dorsal view of North Carolina's five skink species shows subtle size, shape and pattern differences in adults.

ILLUSTRATIONS BY RENALDO G. KUHLER COURTESY OF THE N.C. MUSEUM OF NATURAL SCIENCES

Jeff Beane is a herpetologist with the N.C. Museum of Natural Sciences.

SIDE-BY-SIDE *Seduction*

A CLASSIC OF FORM AND FUNCTION, THE ALLURING SIDE-BY-SIDE SHOTGUN EVOKES THE PAST AND ENRICHES THE PRESENT.

If you are of a certain age, the image of a hunter armed with a side-by-side shotgun behind a dog locked onto point at a field's edge can be as evocative as the petite madeleine was for Proust. That tableau of the wing-shooting triumvirate—bird, dog and gun—summons the past and a wistful longing for a way of life that seems to have passed.

Even if the wing-shooting way of life has not withered away entirely, the scene still can be a melancholy one as we recall those hunters who are no longer living. Hunters may outlive the bird and the dog, but eventually they, too, will remain only as memories. The only tangible thing left is the shotgun. The gun is a token of the past, a cherished relic once carried by those we now know only in memory.

For generations of hunters who pursued quail, grouse, woodcock, snipe or pheasant, that gun likely was a side-by-side. Not that it was the only gun. George Bird Evans, whose 1971 "Upland Shooting Life" chronicles his life in the field, included a photograph in that book of his friends' favorite bird guns. The group portrait consisted of seven side-by-sides in four different gauges, two pumps, two over-and-unders and one semi-automatic. The shotguns ranged from a very expensive Purdey side-by-side to a relatively inexpensive Ithaca pump.

WRITTEN BY JIM WILSON PHOTOGRAPHED BY MELISSA MCGAW

Although any shotgun could be used for bird hunting, the side-by-side was the gun of choice for most hunters, at least in the 19th century and into the 20th. The reason was simple: The side-by-side, first developed in the late 18th century as a flintlock, was the best gun of its time. (And many would argue it remains the best shotgun.) The double-barreled gun served both market waterfowler and quail hunter, not to mention just about any other hunter who pursued North American small game.

In the closing years of the 19th century, a hunter had a choice between a single-barrel shotgun, a repeater and a side-by-side. John Browning introduced a lever-action repeating shotgun in 1887 and the more popular pump shotgun six years later. The double was more expensive, as it is now, because it was more difficult to make. The semi-automatic, capable of holding five or more shells, did not appear until Browning introduced the A-5 in 1903. The "humpback" Browning would become perhaps the most popular and recognizable autoloader ever in this country. In 1905, Remington began production of its own version of the A-5. Other semi-autos came along, as did one of the most dependable and accurate pumps of all time, the Winchester Model 12, introduced in 1912.

However, it was not until around the middle of the last century that the semi-auto became the most popular type of action. Upland bird hunters have used the semi-auto for years, although the over-and-under may have caught up. Wade Teague, director of Quail Unlimited's Mid-Atlantic Region, said he sees a lot of bobwhite hunters with over-and-unders. "I think it's the most popular gun now for quail hunters. I use a 12-gauge semi-auto, a Browning A-5, because that's the gun I grew up with and I'm comfortable with it. But I've also got a 20-gauge over-and-under."

A VINTAGE OBSESSION

Despite the facts, the truth is that the side-by-side holds a special place in the hearts of wing shooters. Why that is may be impossible to answer simply, if at all. Perhaps it is a combination of nostalgia, beauty, feel, a certain grace that the side-by-side possesses that no other gun can match. Why do men develop such affection for things? Maybe it's love. At the very least it's romance, a side-by-side seduction.

Over the last decade or so, side-by-sides have enjoyed a renaissance among wing shooters. Shooters are buying not only new guns but also vintage ones. Many of the new side-bys are European, although a few United States gun-makers still build them. The vintage market holds a combination of British and European shotguns, along with the great American guns from the first half of the 20th century, names such as Parker, L.C. Smith, A.H. Fox and Winchester.

Phillip Futrell of Mid-South Guns in Wagram said his customers cover the whole range of shooters. "We have bird hunters, clay shooters, collectors. Some might be interested in a particular gun, like Parkers; some are interested in the smaller bores. Those guns (small gauges) are the ones that have gone up in price more. I've seen a lot more interest in doubles over the past 10 years, and I think the Vintagers have had something to do with that."

The Vintagers, formed in 1994, is a non-profit organization that espouses, among other things, providing an "opportunity for the use, appreciation and collection of side-by-side shotguns and rifles." Also known as the Order of Edwardian Gunners, Vintagers not only appreciate double guns, but many members like to dress in clothing of the Edwardian era, roughly 1895–1914. That period, called *La Belle Époque* in France, was noted for its high fashion, wealth, class distinctions and manners. (Picture Jeremy Brett's portrayal of Sherlock Holmes to fix a picture of Edwardian society and dress.) It also was a time in which Great Britain was the preeminent world power. British writer J.B. Priestley called the era the "last golden age ... all the more radiant because it is on the other side of the huge black pit of war."

Named for Great Britain's King Edward VII (who ruled from 1901 to 1910), the Edwardian era was a crowning moment in shotgun history. In just over 200 years, the shotgun had evolved from the early flintlocks to muzzle-

Top: Detail of a 1974 FAMARS Castore. Below: Bill Curry (left) and Phillip Floyd enjoy a day in the field for pheasants.

Nominal Bore Diameters*

Gauge	Inches
10	.775 inches
12	.729 inches
16	.662 inches
20	.615 inches
24	.580 inches
28	.550 inches
32	.526 inches
.410 (67 gauge)	.410 inches

*Actual diameter will vary slightly with different manufacturers.

Why is a 12 gauge called a 12 gauge? The gauge is determined by the number of balls exactly the diameter of the barrel that can be made from one pound of lead. Thus, it takes 12 lead balls of .729 inches to weigh one pound.

Top: Three hammer guns: Luciano Bosis (1994), Charles Boswell (circa 1890) and FAMARS Castore (1974). Bottom: Vintager accoutrements include shooting flashes (left) and a Norfolk liar, a game-counting device.

loaders to breech loaders. By the 1820s, the side-by-side began to look like the guns of today. Over the next few decades, shotgun technology raced along: Choke boring was developed (1866), the first hammerless side-bys appeared (1871) and William Anson and John Deeley, employees of British gun-maker Westley Richards, came up with the Anson and Deeley boxlock (1875), an extremely reliable actioning system in which the lockwork is contained within a box-shaped housing. The side-by-side of 1880—the beginning of what the Vintagers call the "Vintage Era"—is very much the gun of 2006. As Ray Poudrier, one of the co-founders of the Vintagers, said: "A boxlock is a boxlock."

For Poudrier, the guns and the social aspects of shooting are part of the same whole. "In 1994, four of us who owned hammer guns said, 'We ought to dress to the gun.' So we put on some old clothes, coats, ties, just stuff we could find. We invited a couple of people to join us. And, by God, it was too much fun, so we invited some more people to join us. We look at it as putting a good face on guns."

The fun has spread to the point that the Vintagers now have 13 chapters in the U.S. and one in Australia. Each year the group holds a national side-by-side championship, primarily for shotguns, but with a few events for double rifles.

Bill Curry, president of the Carolina Chapter of the Vintagers, also found that he liked the easy camaraderie of a group of like-minded people. "Since shooting was nothing new for me, it was a natural transition to go from doing it by myself to doing it with a bunch of friends," he said.

"One of the big things of the Edwardian era was that guns and the social hierarchy were intertwined," Poudrier said. "The social aspects of shooting were important. It was a very accepted thing to do. All the lords and ladies wanted to be a part of it."

Dressing in 100-year-old clothes and socializing, however, are not the main preoccupations of the Vintagers. "Most of our members hunt," Poudrier said. "And 99 percent of them shoot side-by-sides when they're hunting." For most Vintagers, as for many hunters who have attained a certain age, the goals of hunting have changed. "Especially as we get older, the bag limit is just not that important," Poudrier said. "It becomes a lot more about the gun."

Age, too, brings a desire to end a day of shooting without a shoulder made tender from excessive recoil. Most people who shoot vintage side-by-sides, or even new ones, tend to know more about how their guns perform with different loads of powder and shot than do other shotgunners.

The reasons for that expertise are various. Vintage side-bys often have chambers that are shorter than today's standard of 2¾ inches. The chamber, for example, might be 2½ inches or 2⅝. Dropping a pair of 2¾-inch shells into the chambers, even though they appear to fit, can prove hazardous to both shooter and gun. British guns tend to be made for a specific shot charge, using the standard—proposed by gun-maker W. W. Greener—that a gun should be 96 times as heavy as its

shot load. (A gun shooting a 1-ounce load ideally should weigh 6 pounds; one shooting 1¼ ounces should weigh 7½ pounds.) Those who use vintage side-bys, even those with the standard chamber length, have found through experimentation that lighter, low-pressure loads perform just as well on clays and game as do bone-jolting heavier loads. And with much less wear on shooter and gun.

THOSE RACY LITTLE DEVILS

"I just don't need the recoil anymore," Poudrier said. "A light load in a heavy 12-bore is very pleasurable. Men traditionally have shot the 12-bore. When I hunt birds, other than waterfowl, I use a 16-bore or 20. Sixteens have about the right weight, and are just a pleasure to use. For waterfowl, or late-season pheasants, you probably want a 12. Otherwise a 16 is just fine. It doesn't get much better than that. "Most 16-bore shells today are pretty hot loads. They beat you up pretty good. I've found that 950 feet per second is enough to kill any beastie that flies. For pheasant hunting, that 70-yard crosser, maybe 1,050 feet per second. I get a very tight pattern at lower feet per second."

Today a number of cartridge manufacturers, such as Polywad, Gamebore and RST, offer cartridges specifically designed for vintage guns. And they work just fine in modern side-by-sides, too.

Poudrier happens to be a fancier of hammer guns, particularly back-action guns as opposed to bar-action. A back-action sidelock has the mainspring mounted toward the rear of the action, and a bar-action sidelock has the mainspring mounted forward and into the bar of the action.

Top (left to right): An A.H. Fox side-by-side and an antique James Purdey gunmaker label. Middle: Bill and Cindi Curry in the field. Bottom: Vintagers' hammer emblem.

"The lines are beautiful," Poudrier said. "No gun is more fun than an old hammer gun. It has the most elegant of forms. It's a masterpiece of beauty and function. With a hammer gun, all the stuff isn't internal. It has a thinner receiver. It's like a very leggy, 6-foot blonde. The back-action guns are racy little devils. Because the action is in the wood, it has a much leaner form. The bar action is less racy, but it is easier to make and is a coherent whole."

Like Poudrier, Curry finds a special beauty and delight in side-by-sides. "Hunting was a part of everyday life," said Curry, who grew up shooting quail on his father's South Carolina farm. "I've had a great love for and fascination with hunting and side-by-sides my entire life.

"I describe it as a kind of romance," Curry said of side-by-sides. "You actually wrap your hands around the barrels when you shoot; you caress it. There's a lot of artistry involved in these guns, a lot of engraving. There is something about the feel of a side-by that is so much better. It's like a good, smooth whisky, a good port or a shapely woman. Those racy Italian guns, they're very sexy. There is real pleasure to be gained from shooting a gun."

Part of that pleasure, if the gun is vintage, comes in knowing the history of the piece. One of the guns in Curry's collection is a Purdey hammer that was built in 1872 for Sir Henry Ingilby. "It's been pretty neat for me, 134 years later, to take it out and shoot clays or quail. He hunted with that gun, and now I'm enjoying the same gun he did."

Not all of Curry's guns have such history. After losing a 32-gauge side-by-side in a fire at a gun shop, Curry went looking for another. He decided to have one built, but with an extra set of 24-gauge barrels that would fit the same frame. After a couple of European gun-makers refused to build such a gun, Curry fell into conversation (through an interpreter) with a representative of the Italian firm of Poli Armi while attending the Southern Side-by-Side Championship near Sanford. One year later, Curry had his gun. Last year at the Vintagers' World Side-by-Side Championship, Curry won the 24- and 32-bore championships, plus the paired hammer gun and .410 hammerless titles.

Although side-by-sides can be very expensive—into six figures for a bespoke, best gun from such companies as Purdey or Holland & Holland—Curry said it is not necessary for someone to be rich to enjoy side-by-sides.

The Other Double-Barrel — when accuracy is at issue, is an over-and-under the better gun?

Although the side-by-side is the shotgun traditionally associated with wing shooting, the over-and-under is used far more often these days in the field and on the target range. Why that is so is open to discussion. Is the over-and-under a "better" gun, or is it just trendier to shoot?

The side-by-side has been around since the late 18th century, but 100 years passed between its invention and the time the modern over-and-under was developed. There were some early flintlock versions of the gun, but superimposing one barrel on another proved problematic for breech-loading shotguns because of the extra depth required in a receiver for an over-and-under. By the end of the 19th century, British gun-makers were turning out very expensive over-and-unders. It was not until John Browning patented the Browning Superposed in 1926 (the year of his death) and the gun was introduced two years later that an affordable over-and-under reached the public.

In the 21st century, if an American gun-maker sells a double-barrel, in all but a few instances it's going to be an over-and-under. In fact, it was Americans, using the Superposed, who popularized the over-and-under worldwide. Historically, the rifle played a much more significant role in the United States than did the shotgun. The two shotguns that are considered "American" guns, the pump and the autoloader, look like rifles because of the single barrel. (And the lever-action shotgun, though not often seen, looks very much like a rifle.) The over-and-under has much the same appearance. Today the over-and-under is probably the most popular gun for upland bird shooting in the United States, and it rules much of the clay-target world, including Olympic competition.

Like the side-by-side, the over-and-under puts much of its weight between the shooter's hands, making it quick to point and shoot. The over-and-under is heavier on average, which reduces recoil — a definite advantage for a clay shooter. "Gun weight is very important for a competitive shooter," said Bill Curry, president of the Carolinas Chapter of the Vintagers. "Long barrels are an advantage, too. And competitive shooters will use interchangeable choke tubes, which we [Vintagers] abhor. I shoot side-by-sides all the time, but I would probably improve my scores by six, seven or eight targets per round of 100 if I used an over-and-under."

A perceived advantage of the stacked-barrel gun is its single sighting plane, as opposed to the wide plane of a side-by-side. Some shooting experts scoff at the idea of a single sighting plane, saying that shotguns are not aimed but pointed. A shotgun is not a rifle, they say, and if a wing shooter is looking at the barrel of his gun, he is not going to hit his target.

Bill Kempffer of Deep River Sporting Clays near Sanford is a veteran shooting instructor and hunter who uses side-by-sides for both clays and hunting. "If I were to wake up one day and decide I'm going to try out for the Olympic team, I'd start shooting an over-and-under," he said. "What I wonder about, though, is if all you shot was a side-by-side, would you be as good as you would with an over-and-under or an automatic. That's the $64,000 question."

There is historical precedent that could make one believe accuracy is as much a matter of mind as gun. Before the advent of clays, shooters used live pigeons as targets. In Great Britain, the participants at pigeon shoots were of a lower class than those who had entrée to driven pheasant shoots or to grouse and partridge coverts. They weren't necessarily poor, just not of the upper class. For example, E.J. Churchill and Charles Boswell, whose names still grace gun-making firms in England, were noted as superb pigeon shots.

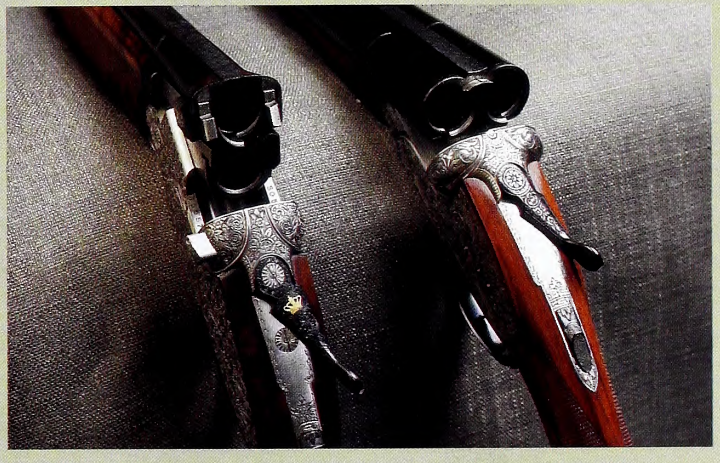
"What makes me think the side-by-side can be just as accurate is that the people who were good shots at live pigeons used side-by-sides," Kempffer said. "When clays and trap came to America, people thought they needed to look right down the barrel to be accurate. When Americans take to something, they tend to want to do it very, very well. The thinking was that the sighting plane of a side-by-side was too wide because of its barrels. The funny thing is, you'd say that makes sense, especially with a long barrel, but competitive shooters prefer a wide rib."

Some also believe that side-bys work better for British shooters or those who have been taught the British method, which is tracking the target with the gun's muzzle, then firing once the stock touches the shooter's cheek. That method is similar to instinctive shooting, what wing shooters do in the field when a quail or grouse rises.

SHOOTING WITH YOUR HANDS

Kempffer uses a baseball analogy to describe instinctive shooting. "In instinctive shooting, you come up on target and let your hands go where they want to go. You think butt, belly, beak, bang. You track past the bird's butt, his belly, his beak, and then you shoot. In baseball, the glove is nothing more than an extension of your hand. You never look at the glove when you catch a ball. The glove facilitates the catching of the ball. Shotgunning is the same. You're shooting with your eyes. The gift is in your hands."

Some shooters also believe that the over-and-under recoils straight back into the shoulder, making it easier for a shooter on the range to acquire his



second target. A side-by-side recoils up and to the side. Those who shoot both guns often use the over-and-under for clays and the side-by-side for the field. Kempffer, however, is not a believer in the recoil theory. "If you shoot the bottom barrel first (the barrel with less choke), then, yes, the axis comes into your shoulder more directly," he said. "If you shoot the over barrel first, you actually get more barrel lift. With a side-by-side there is no difference in which barrel you fire first."

Although the discussion of which gun is better can be both interesting and amusing (the theories abound), shooting is, in the end, a matter of which gun feels more comfortable. I use both an over-and-under and a side-by-side and have done equally as well, or poorly, with either. It is, however, always disconcerting the first few times I shoot a shotgun with one barrel. I like what I see when I swing a side-by-side. It looks like a wide highway leading to the target. Many hunters and shooters, however, do not agree.

The only time you will see side-by-sides in clay competition today is when the competition is restricted to those guns, such as in the Southern Side-by-Side Championship on April 28–30 at Deep River. The Southern, now in its seventh year, brings together a disparate and convivial group of shooters, some wearing breeks and Edwardian shooting jackets, others in shorts or blue jeans. The link among all the groups is a love of side-by-sides and shooting. In addition to the competitors and two tents filled with 35 exhibitors, the Southern also attracts a sizeable group of observers each year.

"I thought it would be popular when we began it, but heavens, no, I never thought we'd see it get this popular," Kempffer said. "We originally did it as a promotion, just to provide a venue, open up the gates and let people see what this was all about. It's turned into a great show. It's like a family reunion for us when our old friends come back each year."

—Jim Wilson

"I taught high school English for 31 years, so, no, I don't live in a $2 million house here in Charlotte," he said. "Back at the turn of the [20th] century, a high-grade Parker was $150, $200. If you consider how little the average person made at that time, paying $6,000 for a shotgun today is a bargain."

FAMILY CONNECTIONS

Sometimes the value of a shotgun can't be measured solely in dollars. Dr. David Thomas' passion for side-by-sides was inspired partly by a relative he never knew. His great-great-grandfather, Robert Jones, was a 19th-century gun-maker in Liverpool, England. "Back then, each town or city would have its own gunmaker," Thomas said. "Production was not as centralized as it is now, and obviously he was before mass production.

"Robert Jones was not a famous gunmaker. I think there were seven or eight Joneses making guns in England at the time. He was sort of the Buick or Chevrolet of gunmakers." Thomas invested years in searching for one of his ancestor's guns. "It took 25 years to find the first one," he said. "Since then, I have found five or six more. All of them have been side-by-sides; a couple have been hammer guns. Most have been standard turn-of-the-century side-by-sides."

Thomas recently located a 16-gauge Jones shotgun, but the barrels were too thin to shoot. He decided to give it to his brother simply to hang on the wall. "It had some nice engraving," Thomas said. "There's a lot of interest in old guns as interior decoration. Each one has so much history associated with it."

Although vintage side-by-sides can—and should—be shot, there is one caveat: Any older gun, particularly one with Damascus barrels, must be examined by a competent gunsmith. Damascus barrels were made by twisting alternating strips of iron and steel around a run, then welding the strips. The rod was then removed and the barrel finished out. By the mid-1820s, Damascus barrels were in general use among gun-makers. The swirling Damascus patterns remain beautiful to this day. Combined with engraving on the lockwork and the already graceful beauty of the gun, Damascus barrels helped elevate the side-by-side into a work of sporting art.

That sense of the gun as art flourished, and today such a company as Abbiatico & Salvinelli might have an engraver working 1,000 hours on the exposed metal of one of

SHOTGUN TIMELINE

1782
William Watts invents the drop-shot process, which produces good-quality, spherical lead shot.

1787
Henry Nock patents a flintlock shotgun in which the touch hole is located on top of the breech plug rather than on the side. This development marks the beginning of the change of field shooting from resting birds to birds on the wing.

1818
Irish gun-making firm of W. & J. Rigby makes the first Damascus twist barrels.

1830
Sparked by A.J. Forsyth's use of fulminate of mercury instead of loose powder in the ignition pan, muzzleloaders gain acceptance over flintlocks.

1851
Paris gun-maker Casimir Lefaucheux debuts his breech action, pinfire cartridge shotgun at the Great Exhibition in London, marking the beginning of the end for muzzleloaders.

1861
George Daw introduces a cartridge with the percussion cap sunk into the center of the base of the case. This is basically the same design that is used today.

1866
Choke boring begins to be used to concentrate the shot pattern.

1871
Theophilus Murcott introduces the first true hammerless shotgun that captured the public's attention. The gun became known as Murcott's Mousetrap because of the sound it makes upon closing.

1875
William Anson and John Deeley of the Westley Richards firm introduce the boxlock action, hammerless shotgun. The original boxlock proved extraordinarily reliable and had but four moving parts. The boxlock action remains in use today and is one of the two primary side-by-side actions, the other being the sidelock.

1880
Steel barrels begin to replace Damascus twist barrels.

1890
First over-and-under hammerless guns appear in England.

1890
President William KcKinley places a tariff on all imported shotguns, thus jump-starting gun manufacturing in the U.S.

its double-barreled guns. Naturally, such work elevates the price of a gun considerably.

Damascus barrels were designed to work primarily with black powder, which burns fast in the chamber. Modern, smokeless powder burns slower, creating lower pressure in the chamber, but much higher at the muzzle. A vintage gun should be nitro-proofed — checked to see if the barrels can handle modern powder. The barrels also can be sleeved, a process in which a new steel barrel is inserted into the old barrel.

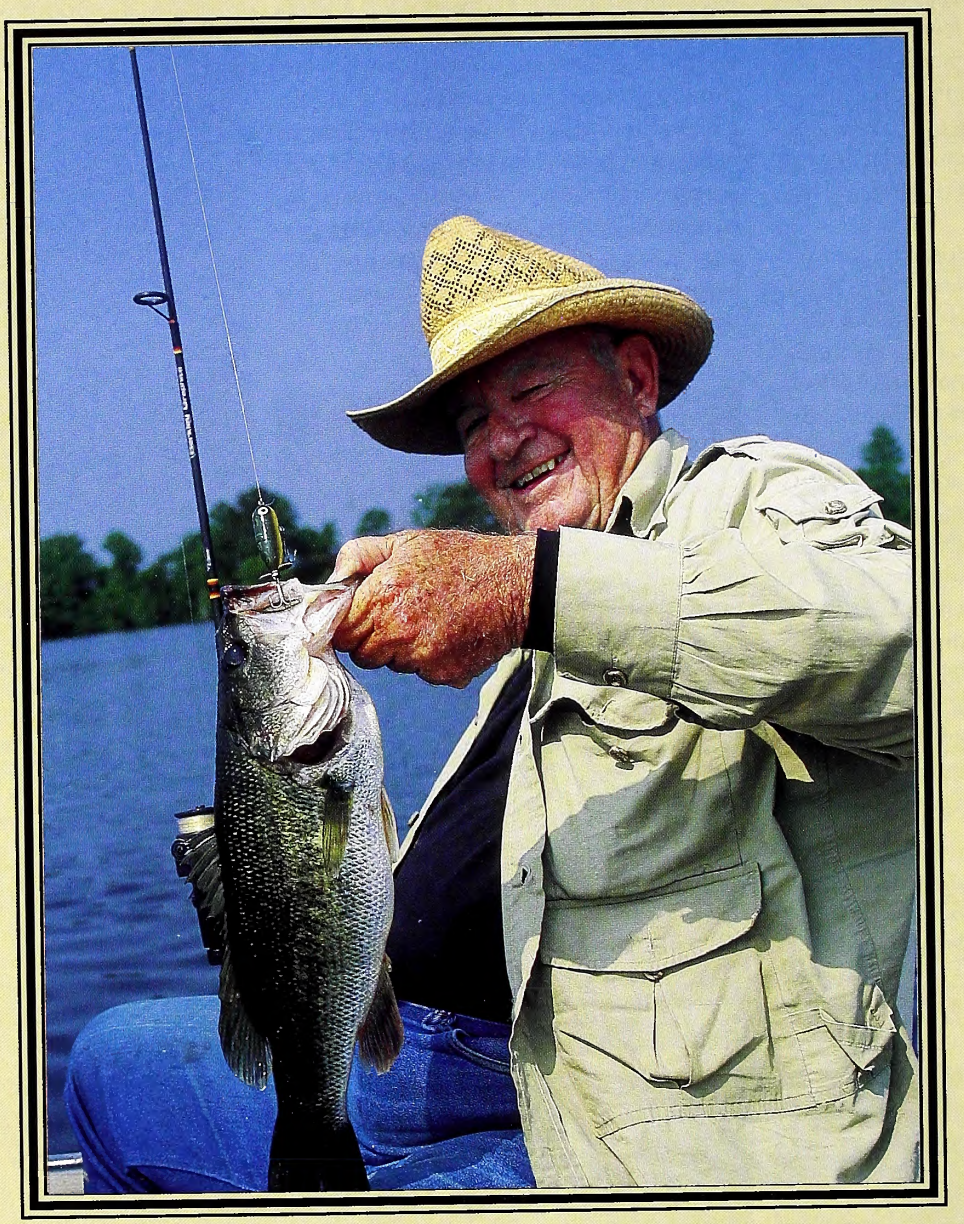
"The very first Jones side-by I got was quite shootable," Thomas said. "Most of the others have had good barrel-wall thickness. Generally the less you do to these old guns, the better. You want it so you can drive it — shoot it. A lot of times, with minimal modifications, you can."

Thomas' shooting has carried him from Sylva, where he runs a regional cancer center, to Georgia to hunt quail with a 28-gauge to Scotland for driven pheasant shoots and rough shooting for partridges. "You can go in any direction as far as your interests," he said. "There's a lot of variation. You can shoot the sub-gauges, vary your shells. It's why shooting is so much fun. I am the furthest thing from being an expert on shooting or shotguns. My knowledge base is probably below average. But with a little bit of knowledge, you can still sound like an expert and not get caught."

That aspiration to become an expert, at least to a minor degree, is common among those of us who shoot side-by-sides. When you are fascinated by a thing, it is natural to want to learn as much as possible about the object of your affection, particularly when, as in the case of vintage side-by-sides, that thing is a piece of history with its story waiting to be revealed. Side-by-sides have an alluring tradition, an appeal that satisfies some urge, perhaps the need as we age to delineate ourselves within a context. Even new guns retain the same look and feel as those more than 100 years old. Picking up a new side-by-side with an oiled walnut stock and straight grip can elicit times, places and people long gone. Like Proust's petite madeleine, the gun summons the past, allowing us to give it meaning. ◆

Right (clockwise): Medal of St. Barbara, patron saint of gunners. Vintager Don Moorhead relishes a pheasant shoot. A matched pair of guns with Damascus barrels, and a game bag with pheasants.

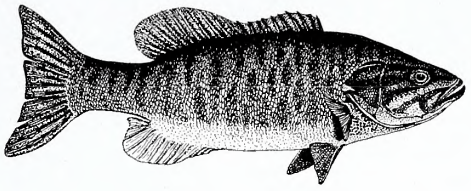
Uncle Billy,



BASS MASTER

Octogenarian bass fisherman Bill Hinnant has tried almost every lure ever invented and every technique imaginable. His decades of experimentation have resulted in methods that consistently produce a great largemouth fishing experience in any season, weather or habitat.

WRITTEN & PHOTOGRAPHED BY F. EUGENE HESTER



For Bill Hinnant, fishing season begins in early January and ends in late December. His 12-foot Leisure Craft sits in a boathouse on Lake Wendell, ready to go at all times. "I can be sitting in my living room and if I decide to go fishing," he said, "I can be backing that boat out of the boathouse and making my first cast eight minutes later."

Over the years Hinnant, who has been nicknamed "Uncle Billy" by his fishing friends, has learned what it takes to catch bass in almost any conditions. "Sometimes in winter the lake has too much ice for me to get my little boat out of the boathouse, so I can't fish then," he said. "But you can catch bass any month of the year if you are willing to change to the right lure and technique."

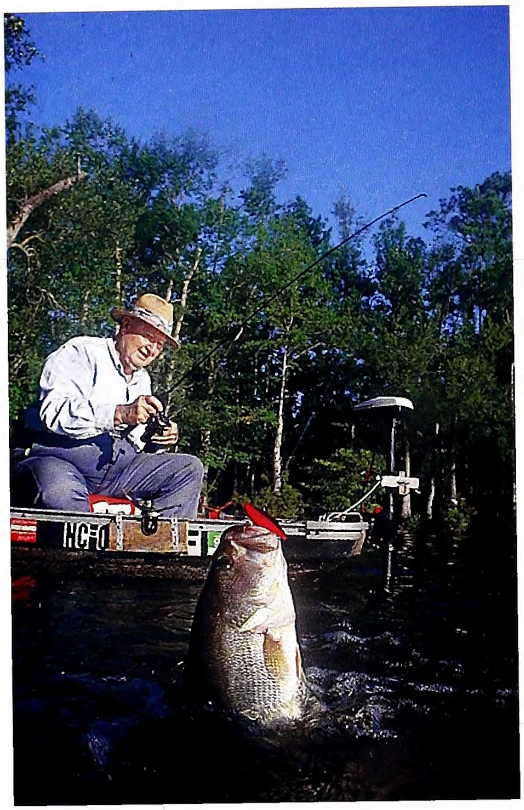
Uncle Billy's nickname reflects the genuine affection felt by the friends who are treated regularly to his combination of wry humor and sage wisdom. A sample of Hinnant's gems: "Most fishermen have a tendency to improve on the truth." "Don't put an 8-pound bass on the scales, because it won't weigh over 5 pounds." "It is a sorry fisherman who can't embellish a fish story." He is the man everyone wishes was his uncle. One of his buddies once remarked that you just feel better from having spent time with him.

The retired insurance estate planner and World War II veteran is beloved among his angler friends because of his willingness to share his decades of wisdom and his professed love of fish tales. Uncle Billy has photos of lots of big bass that he has caught and released, but he also tells of adventures with even bigger largemouths that got away. Some of them jumped up and threw the lure, and others ran around underwater stumps or logs and broke the line. His stories are a combination of indisputable truth, with witnesses and photographic proof, and adventures that seem almost too good to be true. That is what keeps less experienced fishermen enthralled, if sometimes a little bit skeptical.

Some of his favorite stories are about times he has taken lures discarded as ineffective by other fishermen and used them to catch big bass. He also has a way of fishing 50 yards behind you and catching bass that you couldn't catch. When that happens, with tongue in cheek, he will say, "That is so embarrassing!"

Even more than most fishermen, Uncle Billy constantly tries different lures and techniques. One year the Devil's Horse is *the* lure, and the next year he finds the Bass Assassin to be outstanding. The next year it might be the Pop-R or a plastic lizard. Through countless days of experimentation, he has learned the most effective ways to use each lure in his tackle box. "There are dozens of good lures," he said. "You just need to know how to use them."

He has learned when to twitch a lure or to let it remain motionless, or even to retrieve it at top speed to resemble bait trying to escape from the predacious bass. "You have to pay attention and let the bass tell you what they are doing and what mood they are in," Uncle Billy said. "Sometimes, for example, they are actively chasing minnows. When you see minnows jumping, that makes fishing easy, because they are telling you where the bass



Uncle Billy fishes different habitats using various lures as determined by weather, water temperature and the "dinner bell" time when bass feed aggressively. Being prepared with lots of tackle is one way Uncle Billy maximizes his chances.

are and that they are hungry and ready for action. At times like that, I have caught as many as half a dozen bass in one location. . . . At other times the bass are sluggish, especially in very cold or warm water, and you have to give them plenty of time to make a decision. That is when finessing the lure pays off.

"When the bass are inactive, I like to use a Bass Assassin lure," he said. "And I have learned that at those times it is best to let it sink slowly, and then wait a long time before even twitching it the first time. The less you move it, the more effective it is. You have to give the bass all the time it needs to make its decision. If you hurry it too much, the bass will just let it go on by. But give him time to start thinking that grabbing it is his idea, and then he just might go for it.

"At other times, they are really active and ready for a fight, especially as spawning season approaches. When that happens, a bass just might hit the lure as soon as it splashes down, even before you have time to twitch it once. The bass doesn't even have to be tricked into believing that the lure is alive."

At times like that, Uncle Billy's favorite lure is the Devil's Horse, because it makes a lot of noise and waves and can really get the attention of a bass. "And maybe it also aggravates a bass that is trying to keep all critters away from an area he is preparing for spawning," he said.

The Wizard of Lake Wendell

Through the years and with hundreds of days on Lake Wendell, Uncle Billy has come to recognize favorite places that large bass call home. One is where a large pine tree fell into the lake. The tree trunk is now a visible log. "But the tree limbs extend another 40 feet," he said, "and all of those limbs are underwater. That's a favorite bass hangout."

Two other prime spots are where several black gum trees are located a few feet from shore in 4 feet of water. Another is where the massive root system of a large cypress tree provides cover that is the equivalent of a large underwater brush pile. Others are points around the lake where the shore juts into the water, resulting in a sharp drop-off with deep water near the shore.

Then there is the stump near the middle of the lake where several old Christmas trees have been tied. That acts as a bass magnet. There are other, less visible underwater structures, too, but Uncle Billy keeps them to himself. "There is not a bad place to fish in this entire lake," he said. "But there are at least a dozen spots that are so productive for big bass that I won't pass by them without making a few casts, even if I am running out of time."

Within reason, of course. Uncle Billy's interest in eating is well known around Wendell. He even describes himself as enthu-

siastically eating with both hands. Some of his friends have accused him of inviting himself to various local lunches and dinners. "I have never done that," he said, "but I have come pretty close."

One afternoon while he fished on his favorite lake, his little electric motor failed. After tying his boat to a bush, he began waving his white handkerchief. Soon another fisherman came to his rescue and told him he need not have worried because someone would have come looking for him if it got dark and he was still out. "That's not what I was worried about," Uncle Billy said. "I have a ticket to the Clyde's Chapel Church barbecue today, and they quit serving at 7 o'clock."

Quite naturally, Uncle Billy is sensitive to the eating habits of largemouths, too. On any lake on any given day, there may be times when bass mysteriously become active and inactive. He refers to the time when fish suddenly start feeding as "the dinner bell ringing." The feeding frenzy might last an hour or several hours and will end as mysteriously as it started. "What it is that causes fish to turn on like that is one thing I have never been able to figure out," Uncle Billy said. "And I don't think anybody else has the answer, either. I sometimes wonder if even the bass know why it happens that way.

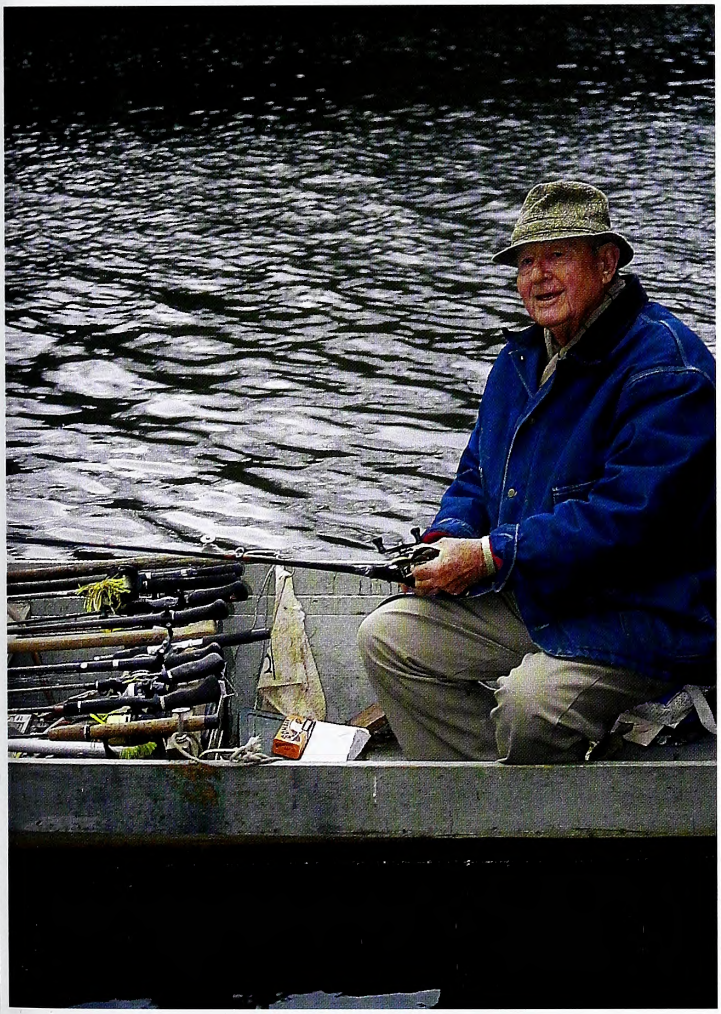
"For quite a few years, when the dinner bell rang, I just kept on fishing along the same shoreline. I simply was thankful that the fishing had improved and so I was taking advantage of my good fortune. Then one day I reasoned that if bass had become so active where I was fishing, they were probably active at other parts of the lake, too. That would mean that it could be my best time to fish at those dozen big bass hangouts."

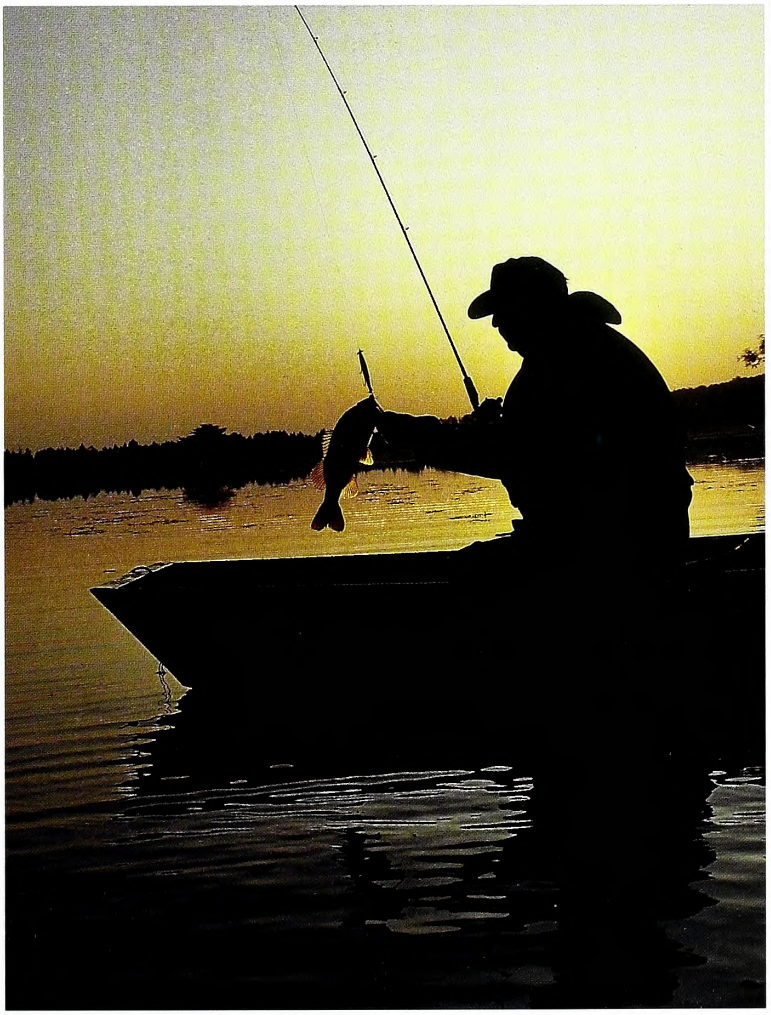
The next time Uncle Billy was fishing and the bass suddenly turned on, instead of continuing to fish the same shoreline, he headed directly to one of his honey holes. The bass were where he predicted, and they were ready to strike lures. "The fishing was great. It was some of the best fishing for big bass that I have ever had," he said. "I was amazed at how such a simple and logical concept could so dramatically change my success. It was so simple and logical that I wondered why it had taken me so long to figure it out.

"I had never previously thought of bass fishing in strategic terms. I had thought of it only as a challenge to learn what lure and presentation were right for a specific day. Now the idea of using the mysterious turn-on time to specifically target the big bass hangouts was adding a new and exciting dimension to my bass fishing."

It is possible that Uncle Billy spends a bit too much time thinking and strategizing about bass fishing. One evening he and his friend Letha Yancey had enjoyed a concert in Raleigh and stopped afterward for coffee and doughnuts. By all accounts, it had been a delightful evening. As they drove east on their way back to Wendell, Letha saw a gorgeous full moon rising directly ahead. "Oh look, Bill, a full moon!" she exclaimed. To which Uncle Billy replied, "I bet the bass would be hitting topwater plugs tonight."

Frequent contributor F. Eugene Hester is retired from the U.S. Fish and Wildlife Service.





In human families, older kids often help care for younger brothers and sisters. Some kinds of wild animals also help their parents care for new offspring. They're

Babysitter Critters

written by Julie Dunlap / illustrated by Consie Powell / nature activity by Anne M. Runyon

A helper crow brings a snack to an incubating mom.

A red-cockaded woodpecker lands high in a longleaf pine tree. He pokes his head into a deep hole and feeds a fat caterpillar to one of the noisy nestlings inside. Then, the bird flies off again, hurrying to collect more food for his hungry brothers and sisters.

IT TAKES A VILLAGE

Most birds and mammals are raised by one or both parents. Even with social animals that live in groups, such as herons or wild horses, each adult usually feeds and protects only its own offspring. But in a few species parents may have help, usually from offspring that did not go off on their own when they reached adulthood. When new young arrive, their older siblings may help with different tasks, from incubating eggs to teaching hunting skills. Raising young together as a family is called cooperative breeding. In North Carolina, cooperative breeders include red-cockaded woodpeckers, brown-headed nuthatches, crows, red wolves, beavers and pine voles.

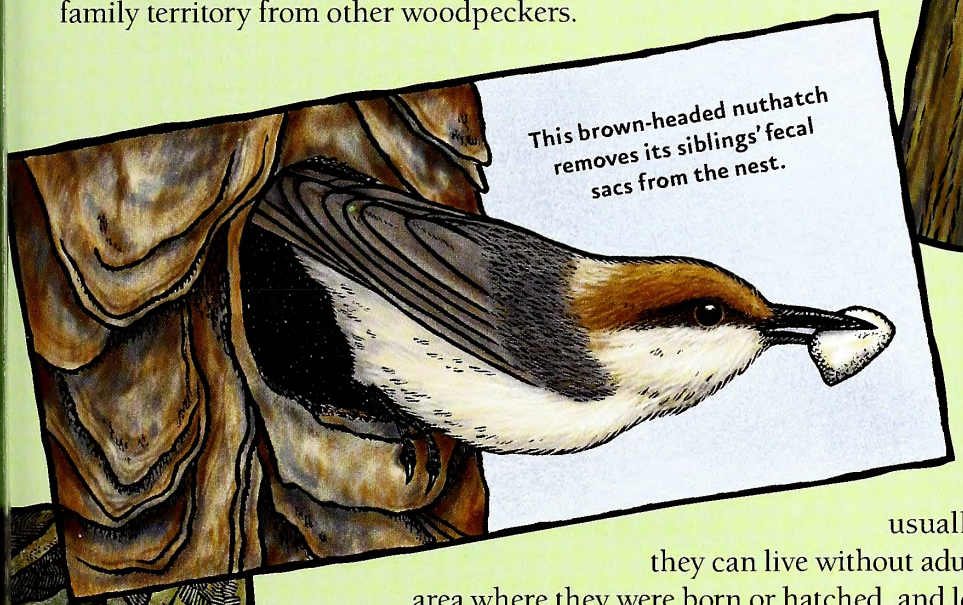
This babysitting pine vole snuggles with the babies to keep them warm.

A yearling beaver helps her family by making repairs to the dam.

DIFFERENT KINDS OF HELP

"Helping" means different things in different animal species. When 2-year-old beavers stay with their parents, they may help fix the family's dam or carry sticks to the lodge for the younger kits' lunch. Helper crows do not warm eggs, but they may bring food to the incubating mother and feed the hatchlings until they can find dinner on their own. Brown-headed nuthatch siblings sometimes help by doing practically anything that the parents do: brooding young, feeding nestlings and removing fecal sacs. A helper pine vole cannot nurse newborns, but it cleans the babies and huddles close to keep them warm. A red wolf may guard the pack's youngest members while their parents are off hunting, or it may carry meat back from a hunt in its stomach and regurgitate, or cough up, a meal for the pups or the pupsitter.

In mammals, most helpers are females, but nearly all nest helpers among red-cockaded woodpeckers are males. Usually sons of the breeding male, the birds assist with excavating the nest cavity, brooding the eggs, feeding the nestlings and defending the family territory from other woodpeckers.



TO STAY OR NOT TO STAY

Like human teenagers that leave for college or to live and work away from home, wild animals usually go off on their own as soon as they can live without adult care. Many disperse, or leave the area where they were born or hatched, and look for a new place where they can find mates and raise their own young. In a way, an animal is not successful until it raises offspring that can carry its genes, or inheritable traits, into the future.

But even if the animals are old enough to survive alone, they face many risks when dispersing. For example, traveling exposes a woodpecker to dangers from hunger and predators. In an unfamiliar area, it may not know where to find enough to eat or safe places to perch. A male red-cockaded woodpecker also needs a territory with several nest cavities or at least big, old pines where he can excavate them. And it takes about 10 years to chisel one hole in a live tree. Without a cluster of nest holes, he cannot attract a mate.

Scientists think that some animals avoid the risks of dispersing by staying put. For a red-cockaded woodpecker, that means living in a clan with his parents and one or more brothers, working together to find ants to eat, avoid hawks and raise the next season's offspring. Males that stay usually have a better chance to survive and become fathers than red-cockaded males that disperse to find new territories.

When a red wolf baby-sits, part of its job may be simply to play with the pups.

WHY DO HELPERS HELP?

Even if an animal doesn't disperse from home, why does it help? Why spend energy feeding and caring for other animals' offspring?

Scientists have several ideas. Helper wolves, for example, may benefit by learning important pup-raising skills, which will help them be successful breeders later. Sometimes, helpers may be paying "rent," contributing work to the family so that the breeding adults let them stick around. In red-cockaded woodpeckers, being allowed to stay means a young male may inherit his father's territory some day. The most popular theory is that helpers benefit when their brothers and sisters live because more of the family's genes survive.

But for many species with helpers, studies have not yet shown that "helping" increases survival of new offspring or future breeding success of the helpers. And in some species, helpers may not even be related to the group's pups. Clearly, scientists need to do more studies to help solve the mysteries of babysitter critters.

Get Outside

Hunting for help: Most wild animals are not cooperative breeders, so you may not get to see it happening in the wild. But you can observe other wild and tame animals to see how they help each other. You might see wild horses at the beach using their tails to swish flies off their neighbors. Or you might hear blue jays screaming to alert the flock to a red-tailed hawk. Why do animals use their energy and even risk their lives to help others in their group? Why don't all animals live in social groups?

Read and Find Out

- "Animal Groups: How Animals Live Together" by Etta Kaner, Kids Can Press.
- "Gray Wolf, Red Wolf" by Dorothy Hinshaw Patent, Clarion Books, 1990.
- "Red-cockaded Woodpeckers: Surviving in a Fire-Maintained Ecosystem" by Richard Conner, D. Craig Rudolph and Jeffrey R. Walters, University of Texas Press, 2001.

In *Wildlife in North Carolina:*

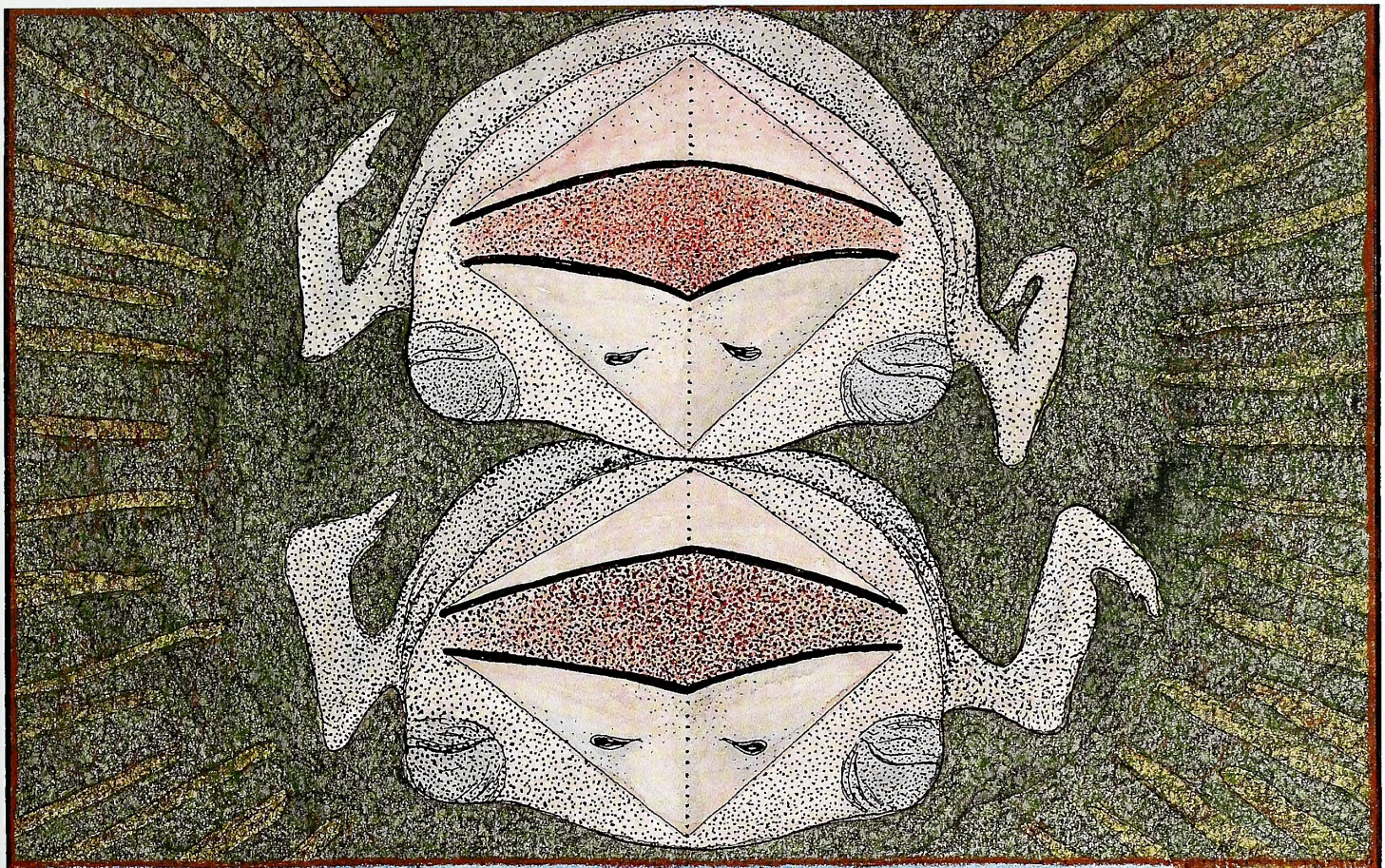
- "Beneficial Beavers" by F. Eugene Hester, August 2001.
- "Get Busy, Beaver!" by Consie Powell, May 1998.

On the World Wide Web:

- National Wildlife Federation's red-cockaded woodpecker profile www.nwf.org/wildlife/redcockadedwoodpecker/
- Information on red wolves of Alligator River from Field Trip Earth www.fieldtripearth.org/div_index.xml?id=2

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Babysitter Critter Pop-Up Card



1) Cut out box and fold in half twice. Big Brother should be on top.

2) Unfold and cut along the four thick black lines inside the nestlings' beaks.

3) Fold into a card again and push up the beaks. They should pop up and down when you close and open the card.

Unlike most birds, red-cockaded woodpeckers are cooperative breeders. Some of the male offspring will remain with their parents at the family nest hole. For several years, these older brothers will help their parents raise the new young. They also help excavate new nest holes in nearby pine trees for their growing woodpecker colony.

red-cockaded woodpeckers © Anne Marshall Runyon

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N.C. Birding Trail Takes Wing

NCWRC

The N.C. Birding Trail has been discussed, even dreamed about, since the late 1990s. The trail has finally become a reality. You can learn about the trail, plus see a list of the sites that have been approved for the Coastal Plain component, at the trail's Web site, www.ncbirdingtrail.org.

The Birding Trail will be a network of bird-watching sites across the state, linked by highways and marketed as a single entity. Birding trails have proven to be successful in more than 30 states, generating millions of ecotourism dollars and providing financial incentives to protect vanishing bird habitat. Heading up the initiative is a newly formed partnership consisting of the N.C. Wildlife Resources Commission and other organizations—the U.S. Fish and Wildlife Service, the N.C. Cooperative Extension Service, N.C. Sea Grant, Audubon NC and N.C. Division of Parks and Recreation.

Salinda Daley, a Wildlife Commission biologist who is the trail coordinator, expects the eastern part of the state to have about 80 sites. Those locations include such spots as

MELISSA McGAW

Masonboro Island near Wilmington, Goose Creek State Park in Washington, Pea Island National Wildlife Refuge, Fort Fisher Historic Site and the National Fish Hatchery in Edenton. The Coastal Plain site nomination process closed as of February," Daley said. "We were very pleased to have received over 100 site nominations across 34 of the 37 counties east of and including I-95."

After the eastern sites are established, the Birding Trail will look at site nominations for the Piedmont and then the Mountains over the next couple of years. Nomination forms can be found at the trail's Web site. Each birding site eventually will be marked with a sign, and Daley said a trail book that will describe each birding area, including species at the site and other nearby sites of interest, is being planned.

The trail has gotten a financial boost recently through grants from public and private sources: $94,000 from the GoldenLEAF Foundation, $10,835 from the Weyerhaeuser Company Foundation, $3,000 from The Wildlife Society and $3,000 from the N.C. Department of Commerce. "These monies move us closer toward implementation of a statewide birding trail that will bring economic, ecological and educational benefits to the citizens of North Carolina," said Daley.

The economic benefits of birding trails can be considerable. The Great Texas Coastal Birding Trail, for example, links 300 viewing sites across 40 counties. In 1999, according to an economic analysis, most bird-watchers who used the trail came from outside the region, spending an average of 31 days per year on the trail and spending $78.50 per person per day. In the U.S. Fish and Wildlife 2001 Survey of Fishing, Hunting and Wildlife-Related Recreation, residents and nonresidents of North Carolina reported spending nearly $827 million on wildlife watching that year.

"The thing we want people across the state to realize is that North Carolina is a birding destination," Daley said. "Having a birding trail will help local communities protect their natural areas. We can have people spending millions of dollars with local businesses each year. This is one of those situations in which conservation and economics can be teammates."

Hunting Gear Sales Surge

It's no secret that hunters like gear, lots of gear. Some of it we might even find a use for one day. Hunting-related equipment sales saw the highest percentage increase of all athletic and sports equipment during 2004, according to a report from the National Sporting Goods Association (NSGA). The estimated sales of hunting-related equipment totaled $2.8 billion in 2004, up 8 percent from the previous year. Fishing sales rose 2 percent.

That's welcome news for the hunting industry and for conservationists, said Doug Painter, president of the National Shooting Sports Foundation (NSSF), the trade association for the hunting and shooting sports industry. NSSF administers a variety of programs to keep hunters active by increasing opportunities for them to go afield. "These figures show that our industry is out front in innovating new and better gear, and that hunters are willing to spend their hard-earned dollars for further enjoyment of their favorite outdoor pastime," Painter said.

"In addition, wildlife and habitat programs are the sole beneficiaries of special excise taxes collected from hunting products, so robust sales should be welcome news to everyone who appreciates a healthy outdoors."

Within the hunting-related equipment category, firearms saw a 9.5 percent sales increase to $1.9 billion. Rifle sales ($722 million) showed a 16.5 percent increase, handgun sales ($524 million) increased 10.4 percent, shotgun sales ($534 million) were up 1.9 percent and air gun sales ($120 million) rose 3 percent.

Particularly strong sales were seen in hunting-related footwear, a category in which sales increased 21 percent, a rise unmatched in any other category of athletic footwear.

At $2.8 billion in total sales, hunting-related equipment ranked third among all athletic and sports equipment categories in 2004, with only golf ($3.1 billion) and exercise equipment ($5 billion) ranking higher.

NSGA findings are based on surveys and interviews with 100,000 U.S. households.

Winter Turkey Season Harvest Remains Low

For the third straight year, few hunters took advantage of North Carolina's either-sex winter turkey season. Hunters killed 174 turkeys in January, just about the same number as they have done during the previous two years of the season's existence.

In 2004, the total take was 181 birds, followed by 151 the following year. However, the 2005 total was certainly higher because the telephone reporting system malfunctioned on the opening day of that season after only three birds had been reported. The winter season, which lasts six days, is open in 10 of the state's 100 counties. Of the 174 turkeys killed, 97 were male.

While the winter season has yet to capture hunters' imaginations, the spring season, which runs from April 8 to May 6 statewide, is another matter entirely. That season is one of the most anticipated in the state. In 2004, hunters took 9,824 bearded turkeys, about 1,000 more than the previous season. North Carolina's wild turkey population is estimated at about 150,000 birds.

Spring hunting for turkeys has not always been popular, however. "North Carolina had a strong tradition of fall turkey hunting," said Mike Seamster, the N.C. Wildlife Resources Commission's upland game bird biologist. "When the season was changed to spring-only [1972], turkey hunters across the state said we were going to wipe out turkeys."

Years of successful seasons and a growing population proved those fears unfounded. From a low of 2,000 birds in 1970, North Carolina's wild turkey population rebounded during the 1970s and '80s to about 28,000. During the decade of the '90s, however, the population exploded, increasing to about 130,000 by 2000.

Hunters should see plenty of turkeys this month, including a good number of 2-year-old birds in the population. Those 2-year-olds are usually the easiest to kill. The hatch of 2005, however, was very poor—the second-worst on record—and will limit the number of jakes (yearling birds) in the population.

2006 Winter Wild Turkey Harvest

County	Total	Adult Males	Jakes	Hens
Wilkes	31	12	9	10
Alleghany	29	10	5	14
Ashe	19	7	3	9
Watauga	18	4	3	11
Caswell	17	10	1	6
Rockingham	17	7	4	6
Stokes	16	7	0	9
Granville	10	2	4	4
Surry	10	4	1	5
Person	7	3	1	3
Totals	174	66	31	77

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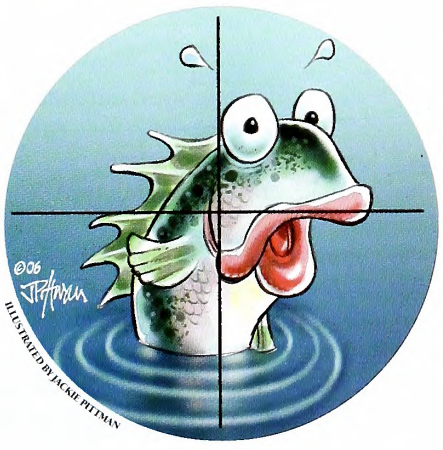


Area Four Sgt. Barry Rowell and Officer Donald LaTulipe were working the fishing beat on Cane Creek Lake in Union County when they saw two men at the far end of the lake in the shallows. Rowell and LaTulipe went to the bank and tied their boat. They walked the bank back to where the two men were and immediately noticed one holding a rifle.

The officers watched as the two subjects were passing the rifle back and forth, taking turns shooting at fish. When Rowell and LaTulipe approached the subject with the rifle, he threw the gun in the lake. Rowell retrieved the rifle, while LaTulipe detained the two men. They were charged with taking fish by unlawful method and registered property violations.

Hatchery-Supported Trout Waters Open

The traditional start to a new trout season gets under way at 6 a.m. on April 1 when the N.C. Wildlife Resources Commission opens approximately 1,100 miles of hatchery-supported trout waters in the western part of the state. The season will run until one-half hour after sunset on Feb. 28, 2007.

NCWRC

While fishing hatchery-supported waters, anglers can harvest a maximum of seven trout per day, with no minimum size limits or bait restrictions. These waters are identifiable by green and white signs, and are stocked regularly from March until August each year. Many of these waters are stocked monthly, although some heavily fished waters are stocked more frequently. Hatchery-supported waters are listed in the *2005–2006 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* or on the Internet at www.ncwildlife.org. Trout maps and stocking information also are available at the commission's Web site.

This year, the commission will stock more than 750,000 catchable-sized trout in these streams. The ratio of stocked fish for most streams is 40 percent brook trout, 40 percent rainbow trout and 20 percent brown trout. Ninety-six percent of the stocked fish average 10 inches in length, while the remaining fish exceed 14 inches in length. "We tend to hit all those numbers pretty closely," said Carl Kittel, coldwater production coordinator for the commission. "They may vary by a couple of thousand, but we're pretty close."

NCWRC

The trout are grown in four mountain region fish hatcheries operated by the Wildlife Commission. Fish are distributed along hatchery-supported streams wherever public access for fishing is available. Kittel said the trout spend two winters at the hatcheries before being stocked. "We use natural spawning, so we take eggs in the fall. Since you can have hatching into late December, the fish will not reach 10 inches until they're about 16 months old. The eggs we took in the fall of 2004 will be the fish we stock in 2006."

IN SEASON

This month, these seasons are open in North Carolina:

Striped Bass (Roanoke River): Continues through April 15 on lower Roanoke and April 30 on upper Roanoke.

Trout (Hatchery-supported waters): Opens April 1 at 6 a.m. through Feb. 28, 2007.

Wild Turkey: April 8 through May 6.

Check the *2006–2007 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

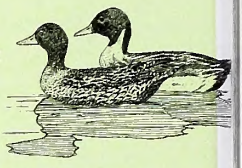
CALENDAR OF EVENTS

Wednesday–Sunday, April 5–9

Join the festivities and celebrate the shad run on Contentnea Creek at the 36th Annual Grifton Shad Festival. Most events take place on April 8–9. Contact (252) 524-4356 or visit www.grifton.com.

Saturday, April 8

Learn about native and exotic waterfowl at Duck Day at Sylvan Heights Waterfowl Center in Scotland Neck. The center has more than 3,000 birds and 160 species of waterfowl. Visit www.townofscotlandneck.com or call (252) 826-3152.



Friday–Sunday, April 28–30

Check out the seventh annual Southern Side-by-Side Championship at Deep River Sporting Clays near Sanford. Competitions will be held for side-by-side shotguns of various gauges. Exhibitors include such gunmakers as Atkin, Grant & Lang, Charles Boswell, FAMARS and Poli. Contact (919) 774-7080 or visit www.withersravenel.com/DeepRiver/.

Saturday, April 29

Get out your canoe and enjoy a day on the water during the Dan River Canoe Paddle in Rockingham. Registration with Piedmont Environmental Center in High Point is required. Contact (336) 883-8531 or visit www.piedmontenvironmental.com.

Saturday, April 29

Join an early celebration of International Migratory Bird Day with a festival from 9 a.m. to 3 p.m. at Blue Jay County Park near Raleigh. Contact (919) 870-4330 or visit www.wakegov.com/parks.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

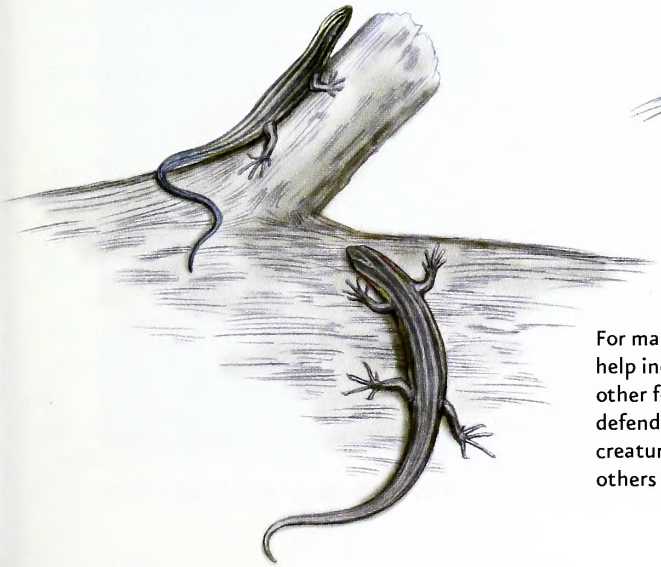
How Do Skinks Use Their Stripes?

written by Jeff Beane
illustrated by Alison Schroeer

STRIPES CAN CREATE AN optical illusion, making it hard for a predator to determine where an animal begins and ends. When a striped animal moves forward, the stripes create the perception that it is closer than it actually is, and the predator strikes to the rear of the fleeing animal. Many striped lizards and snakes have stub tails as a result.

Bold markings on many creatures advertise toxicity, unpalatability or potential danger. Skink stripes may issue a warning to other animals. It is thought that skinks may taste bad to some animals.

Stripes may camouflage a skink lying in grass or pine needles.



For many species, especially fish and birds, markings help individuals of the same species recognize each other for social interactions such as mating and defending territories. Lizards are visually oriented creatures, so a skink's stripes may help it identify others of its own species.

Trout Fishing's Sacred Day

written by Jim Dean

It was already well past dark when I turned off Highway 181 at Jonas Ridge onto a single-lane gravel road. The road was like a coiled rope that had been flung against the side of the mountain, and the cottony wall of fog was so thick that I could barely see, even with the headlights on low beam. I bounced down washboards, observing nervously that the shoulder of the narrow track always seemed to fall away on one side as sharply as it rose on the other. There were no safety barriers, no signs, no lights; nothing but endless turns, fog and that visible patch of steeply descending gravel through it.

JIM DEAN

I was headed into an 80,000-acre near-wilderness then known as the Daniel Boone Wildlife Refuge for opening day of the 1967 trout season, but I had never been there and I was beginning to doubt my directions. Earlier that year, I'd had the good fortune to meet Chester Davis, who was outdoor editor of the *Winston-Salem Journal*. We discovered we shared an obsession for trout fishing, and I told him I thought his columns — with their subtle, self-deprecating humor — compared favorably with those of Red Smith. Even so, I was surprised at Chester's opening day invitation. I was later to learn that it also came as a surprise to our hosts, since he had neglected to tell them I was coming until I was already wandering in the fog.

"I had been sucked through some cosmic wormhole and deposited into an earlier century."

It took nearly two hours to reach the base of the mountain where I pulled up in front of a sagging clapboard store with a single gas pump out front. A porch light came on at an adjacent house, and a man emerged from the fog.

"We've been worried about you," he said, nodding toward faint headlights that appeared up the road. "That's probably them now coming to use my phone and report you missing."

I had no inkling that Chester would be introducing me to some of the dearest friends I would ever have — A.J. Johnson and his son Alvin, Reid Bahnson, Frank Clinard and store owner Archie Coffey. Nor did I suspect that my opening days would be linked to this place for the next 40 years (though only Alvin and I are still living now). But I already sensed something special in the dank smell of forest, the sleepy chorus of spring peepers and the promising rush of nearby unseen water. I also recall feeling that I had been sucked through some cosmic wormhole and deposited into an earlier century.

That opening day is still the benchmark by which I measure all that have followed, but it did not occur to me then that I was also being measured. As the youngest (and least skilled) in the group, I was assigned the role of "Chester Guardian." I innocently assumed that this honor fell upon me because I knew Chester.

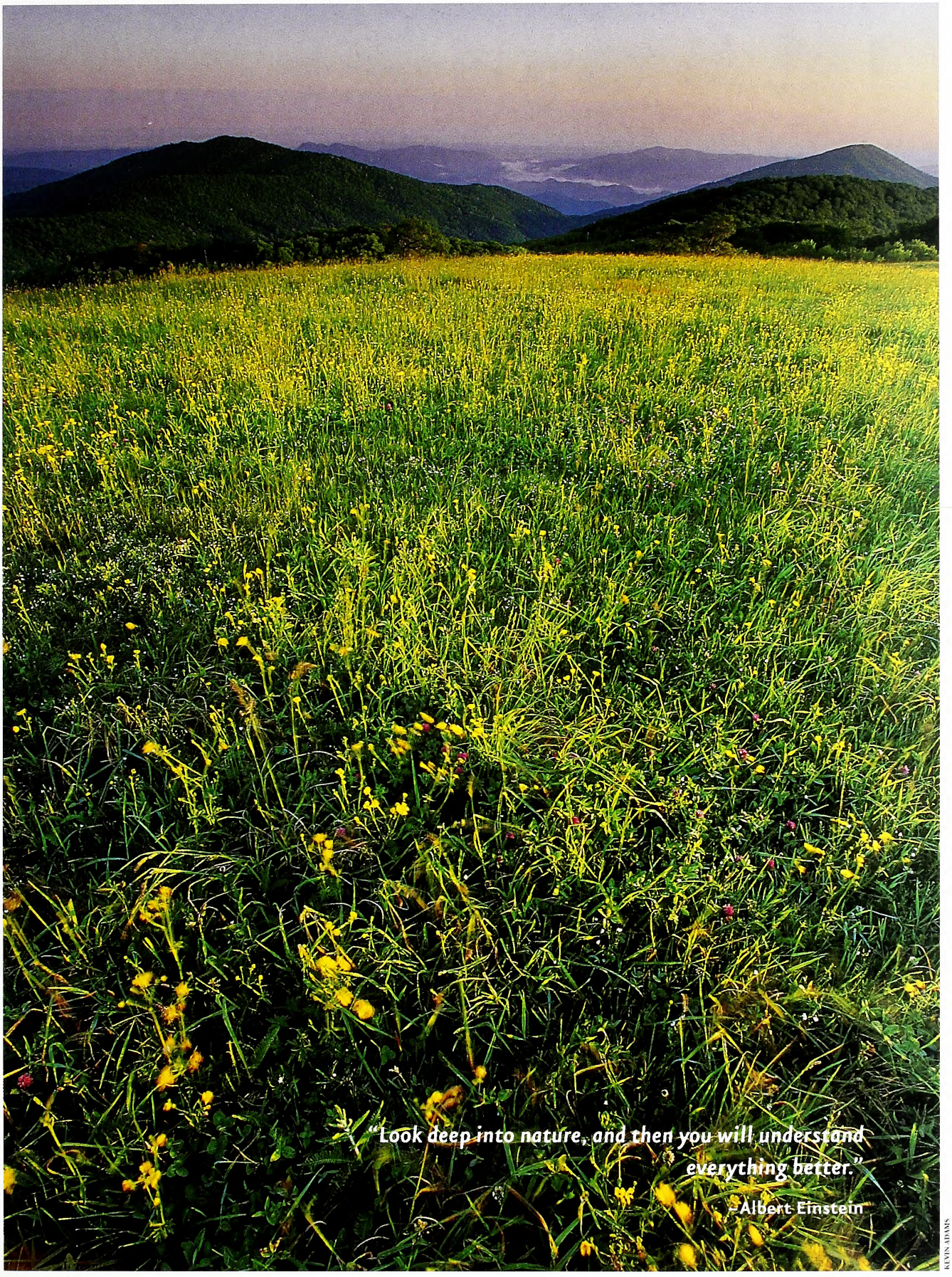
The next morning, we left A.J.'s cabin and drove to a large stream roaring with snowmelt where Chester and I were dropped off to fish together. While I was rigging my tackle, Chester refilled his tall glass with straight bourbon and began to wade into the torrent. I was about to issue a warning when he simply disappeared. His floating hat and the arm holding the glass proceeded rapidly downstream.

I raced down the bank and waded out into the water just as Chester fetched up on a gravel bar. I pulled him out dripping wet, yet still triumphantly holding his libation aloft and uncontaminated by river water. He was more than happy to spend the rest of the day in a nearby lodge wrapped in blankets in front of a log fire. I continued fishing that afternoon alone, but caught nothing.

The following morning, Chester thoughtfully remarked that I needed assistance and volunteered A.J.'s services. We drove to a trailhead and hiked high up into Wilson Creek. A.J. suggested that I fish while he watched to see what I was doing wrong, which, he concluded, was pretty much everything. "If you learn to catch these wild browns, you can catch trout anywhere," A.J. told me. Then, he showed me how to fish a sinking fly under a floating fly — a tactic he originated. I finally managed to catch several trout.

At dark, we all piled into A.J.'s old Bronco and four-wheeled back down the two-track alongside the creek. As we forded a tributary, A.J. stopped in mid-stream, opened the door and dipped a cupful of icy water. Reid produced a plastic Maalox bottle that looked suspiciously well worn. He took a snort and swapped it for A.J.'s chaser. The ceremony was repeated with each occupant. Then Johnson turned to me.

"You caught a few wild browns, rescued Chester and didn't otherwise embarrass yourself," he said gruffly. "We hope you'll come back."

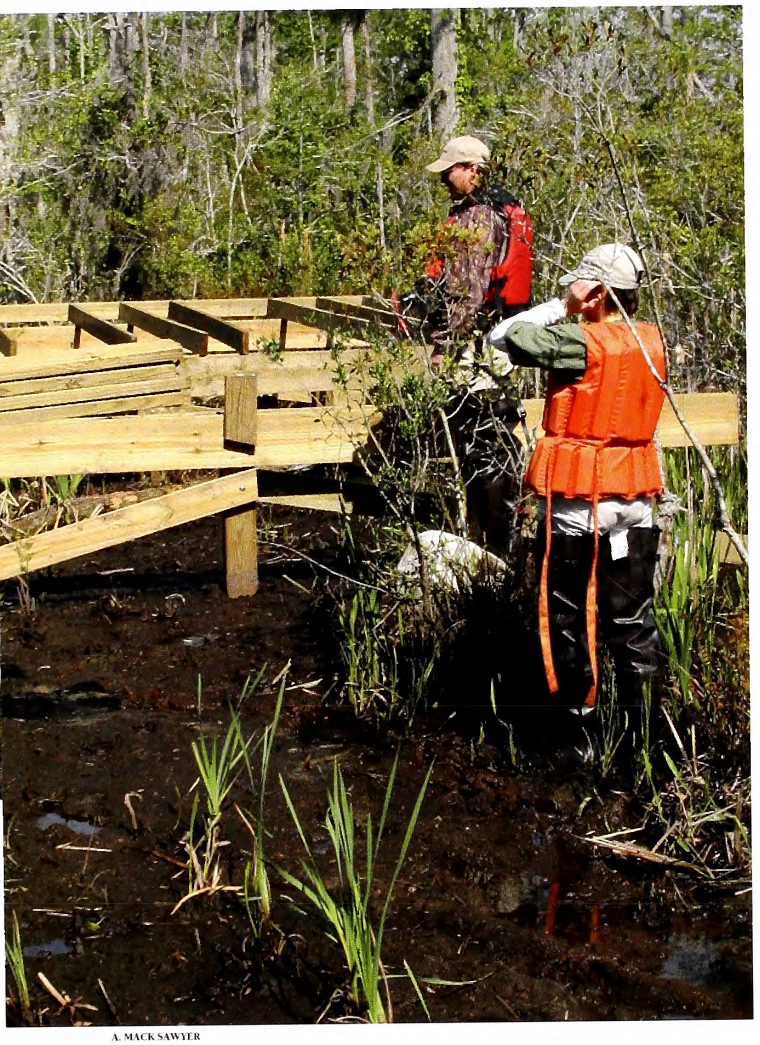


KEVIN ADAMS

OUTDOOR MOMENT

Max Patch Mountain

IN THE MAY ISSUE



A. MACK SAWYER

PALMETTO-PEARTREE PRESERVE

Paddling trails and a camping platform make this Tyrrell County nature preserve a good place to see bald eagles, peregrine falcons and red-cockaded woodpeckers.

TURKEYS RESTORED

North Carolina's 78-year-old turkey restoration program has come to an end, after meeting and then exceeding its original goals.

IVORY-BILLED WOODPECKER IN N.C.

Documentation of ivory-billed woodpeckers in Arkansas produced millions of dollars for research and habitat last year. What happened when North Carolina's last ivory-bill was recorded?

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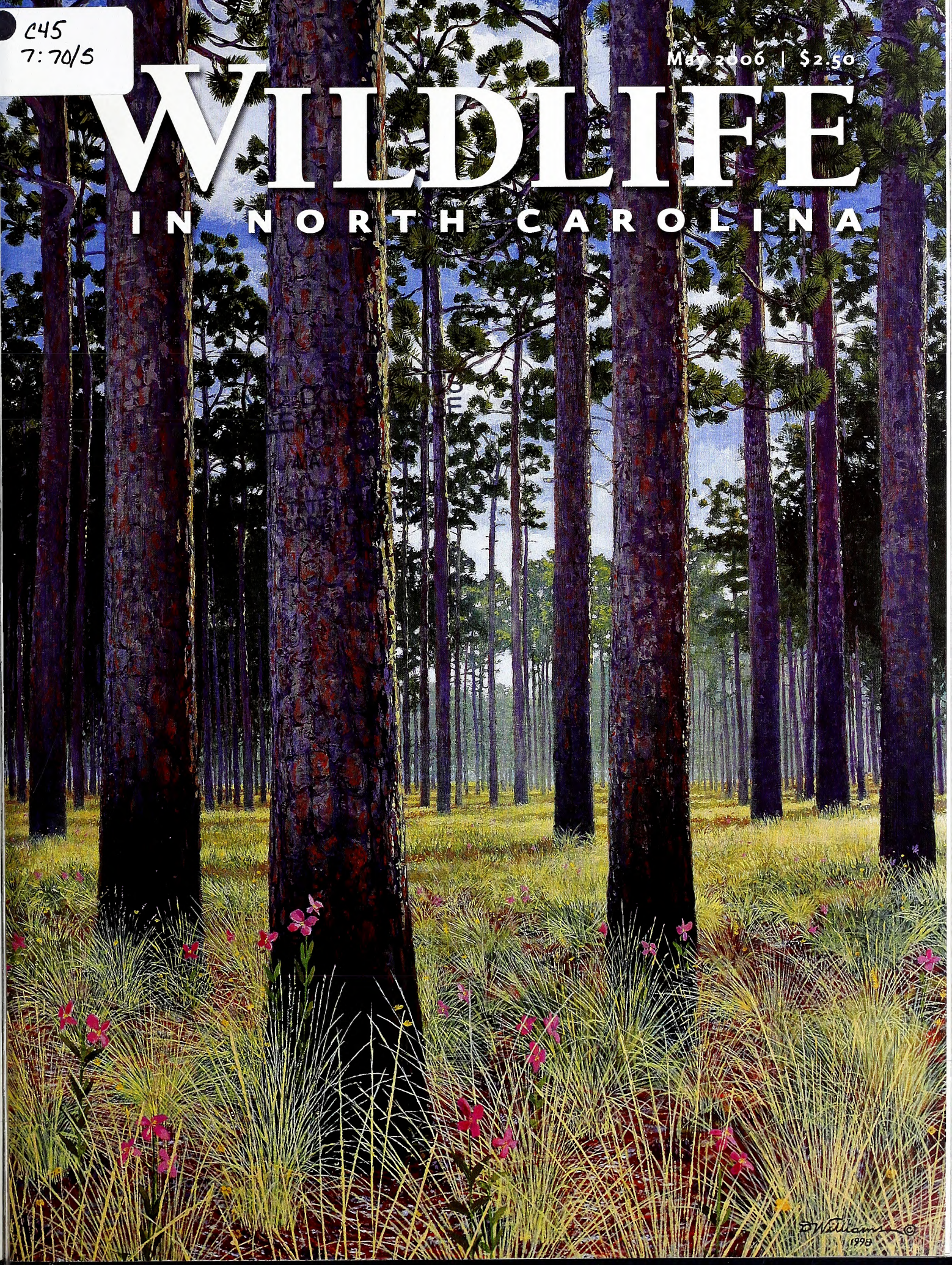
WILDLIFE IN NORTH CAROLINA



From the unique perspective of being hunkered down in marsh grass, we see sunlight dancing off descending snow geese—a scene both dramatic and tranquil. **ARTWORK BY DAVID WILLIAMS.**

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Cover: Superior artistry gives this painting of a longleaf pine savanna an almost photorealistic quality. ARTWORK BY DAVID WILLIAMS.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Many of our most pleasant memories tend to come equipped with a hazy filter that gives them an almost dreamlike quality. In retrospect, we and those we love seem smarter, stronger and better-looking than perhaps we really were. We remember the good times as great times, and we laugh and shake our heads about the bad times.

In this issue, we place a magnifying glass on the past and discover that maybe it really was the best of times. Our cover painting, the first piece of artwork that has run on the front of this magazine since 1998, is by renowned wildlife artist David Williams. Those familiar with *Wildlife in North Carolina* are familiar with David, because after he joined the magazine as art director in the late 1970s, he contributed nonstop to these pages for almost 30 years. Of the more than 350 issues that have been published over the last three decades, only a handful have been produced without David's artwork.

David's studies for the painting on our cover.

The latter half of this magazine contains a heaping helping of Williams' art from the past and present. You see, aside from the occasional recycled illustration of David's, this will be the last issue of *WINC* that contains his art. Early on the morning of Jan. 28, David died of a stroke while preparing to go duck hunting. He had two separate but related projects in the works for us at the time—the illustrations that accompany "Mr. Wilson's Woodpecker" (page 26) and the Nature's Ways on woodpeckers (page 39). He was unable to complete either of them, but we decided to use his unfinished art with "Mr. Wilson" anyway.

We at the magazine will miss David terribly. Whether you realize it immediately or not, you will miss seeing his art on these pages. That's why we decided to run the career retrospective that begins on page 18. As it turns out, seeing a big bunch of David's artwork together reveals that our memories were accurate this time. There was no need for that built-in hazy filter; David really was that good. Enjoy the artwork. It represents the end of an era.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

MAY 2006 VOLUME 70, NUMBER 5

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Purchase a license 1-888-248-6834 (2HUNTFISH)
Report big game harvests 1-800-446-8663 (I GOT ONE)
Magazine subscriptions 1-866-945-3746 (WILDSHOP)

It's Easier Being Green

I truly enjoyed Jack Horan's article about the revival of Little Sugar Creek ("Urban Trails: Greenway Revives Little Sugar Creek," March 2006). I'm a Charlotte resident with Little Sugar Creek running directly behind my house as it flows into Freedom Park. I've seen the revival slowly taking place along Kings Drive, where all the businesses are gone and are now replaced by green grass and lovely landscaping. Now the revitalization has reached the area behind my home. I've seen the creek and the land around it turn from a less than an attractive sight to a beautiful and serene setting perfect for bikers and walkers.

At a time when the powers-that-be in Charlotte seem transfixed on new sports arenas and NASCAR museums, it's very refreshing as a taxpayer to see our money going to something beautiful and beneficial to all the citizens and wildlife alike.

Mealie Macmurphy
Charlotte

Tool Problems

I found the article "Whooping Crane Makes Return Visit" (March 2006) in the Back Porch department of the magazine very interesting. One individual whooping crane, of the population spoken of in past articles in *WINC*, was located in a pond near Washington in December and quickly captured and relocated to join a group spending the winter in sunny Florida. I am wondering if this may have been natural selection trying to take place here but was prevented from happening. Although people are the ones helping the populations to increase, we must not forget that nature is ultimately in control of all population management.

The biological mechanisms by which many species migrate are still largely a mystery. Just why did this particular bird become "disoriented?" This individual may have had some sort of problem with its migration "tool." If this problem should happen to be inheritable we may find in the near future that there are even more whooping cranes with issues of disorientation. I believe this will be an interesting theory to test and I for one will be watching for more stories on misplaced whooping cranes.

Adam McDaniel
Vale

I was delighted to see the article about the whooping crane in the March issue but want to point out a mistake that was made. The area where the bird was sighted, Blounts Creek, is in Beaufort County, not Martin County. I work at the *Washington Daily News* and was very excited when our news editor, Jonathan Clayborne, wrote his stories about this rare bird. Kudos to Mr. Mayo and others like him who are helping to preserve our vanishing natural resources.

Brenda Watters
Washington

Warm Thoughts

North Carolina can do something about the impacts of global warming on wildlife and their varied habitats ("Wildlife and Global Warming," Feb. 2006). Fortunately, lawmakers already have established an N.C. Global Warming Commission, which will help choose solutions that use energy more efficiently, reduce our dependence on foreign oil and strengthen the state's economy. Working together, North Carolinians can reduce global warming pollution and make our state a healthier and cleaner place to live for wildlife and humans alike — if we make a commitment now to long-term solutions. Readers can learn more about global warming at www.environmentaldefense.org.

Michael Shore
Senior Air Policy Analyst
Environmental Defense
Asheville

Many Happy Returns

Thank you for the wonderful publication of *Wildlife in North Carolina*. Old copies are passed on to friends living all across the United States. The magazines are like Energizer batteries — they keep going and going! Certain issues I do keep in my library. Thank you for valuable information on our state's wildlife species. North Carolina is a beautiful state to live in. Keep up the good work.

Matthew Weaver
Salisbury

Sunday Statement

As an avid outdoorsman and conservationist, I am writing this letter in support of the recent activity concerning GA 103-2, which bans Sunday hunting in North Carolina. It is this citizen's wishes that this antiquated, 137-year-old statute be changed, reversed or eliminated altogether.

In our neighboring states, the economic benefits from Sunday hunting far outweigh any detriment to wildlife as well as to any religious or social groups. Sunday hunting has been a staple in many southern states for decades.

The increased revenue from taxes upon fuel, hotel or motel rooms, food, entertainment, hunting equipment and outfitter or guide incomes could represent a large sum of money to the state.

This state's hunting citizens have been waiting too long for the General Assembly to grant this most simple of rights.

Mike Keadle
Apex

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

RALPH HENSLEY

MISSION ACCOMPLISHED

North Carolina's wild turkey restoration program has taken a bird once on the verge of extirpation from bust to boom.

The turkeys had talked for much of the morning, and then suddenly they were quiet. A misty rain that had fallen intermittently since before dawn began again, dropping so softly that it made no noise. As I tried to figure out where the turkeys might have gone, the rain intensified, not yet hard, but more than the gray swirl it had been. I could feel it soaking my gloved hands, and for the first time that day I was grateful that the January temperature was in the mid-50s instead of the mid-30s.

Even if no turkeys ventured out into the pasture, I figured the day could still be classified as a partial success. Despite arriving in Granville County 15 minutes later than planned, I had walked three turkeys from their roosts just 30 yards from where I would set up to hunt. The birds, displaying more grace than seemed possible for their size, had flapped from their trees then pitched down into another pasture. I heard them clucking in the hardwoods for a while and then nothing.

Crows had started to fill in the morning with their caws. One particularly noisy critter sat atop a hickory tree a few feet away, regaling his buddies with whatever crows talk about. I hoped I wasn't the topic of conversation.

written by Jim Wilson

Gradually I had become aware of another noise, a pleasant, low sound that I couldn't quite place. Then I realized I was hearing turkeys, a lot of turkeys. A flock was working its way through the woods, maybe 100 yards away. The sound grew louder, then faded, louder again, then distant and finally there was that silence so complete that it seemed to have a presence of its own.

I flipped up the hood of my coat, and a few cold raindrops slid down my neck. After 15 minutes of hearing and seeing nothing, I cupped my chin in my hands, closed my eyes and started to drift. Good things really can happen when you fall asleep in a blind, often the least of which is sleep. A cluck and a sweet, low turkey purr fetched me back from near-sleep. Just to my left, several hens had topped the pasture ridge and were making their way toward me. More birds followed, and as they marched closer, I picked out a few jakes with the brushy beginnings of beards and three long-bearded gobblers.

Several hens fed their way in front of me, and I raised my shotgun, took aim at one's head but didn't fire. Over the next few minutes I put the gun on four different turkeys, including one busy jake who paraded back and forth within 12 feet of my blind. *Dead turkey walking*, I thought, but still I didn't shoot. Why? I know I had a reason (and have since questioned my judgment). Certainly, I was more interested in waiting out the three gobblers, but they remained well out of range in the middle of the pasture. Maybe it was as simple as feeling that I did not have to kill a bird that morning in order to possess it. It was a great hunt without my firing a shot.

I counted 37 turkeys working over the pasture in the rain, a nice flock, but nothing uncommon in many areas of the state. In 1970, however, a flock of birds the same size would have accounted for nearly 2 percent of North Carolina's entire wild turkey population, which was estimated at just 2,000 birds.

RALPH HENSLEY

Biologist Vic French (below left and center) uses a dip net to subdue a turkey that had been drugged for capture. The commission phased out drugs in favor of more trapping with rocket nets (below right).

DARK DAYS FOR TURKEYS

Biologists believe that the wild turkey, *Meleagris gallopavo*, was plentiful when Europeans colonized the East Coast of the United States. American Indians, through their forest and field management, provided good habitat for the birds and hunted them for both food and feathers for several thousand years. Europeans quickly developed a fondness for turkey on the table and hunted the bird relentlessly. By 1920, wild turkeys had been extirpated from 18 of the 39 states that made up their ancestral range. Biologists estimate that the entire population of wild turkeys in the United States in 1930 consisted of just 30,000 birds.

North Carolina's efforts to restore this popular upland game bird began in 1928 under the aegis of the Department of Game and Inland Fisheries, the predecessor of the N.C. Wildlife Resources Commission. For the next 16 years, that agency's efforts at rebuilding wild turkey populations centered on artificial propagation and the release of pen-raised turkeys. By 1946, Game and Inland Fisheries had released about 10,000 pen-raised turkeys and distributed another 2,000 eggs. Hunting clubs and individuals released thousands more and continued to do so into the early 1970s.

As with every other state that released pen-raised turkeys, North Carolina's efforts failed. Although game-farm turkeys might have looked like wild turkeys, they lacked the necessary skills to survive in the wild. The pen-reared birds also carried diseases they could pass to wild turkeys. Another threat was their potential breeding with the wild stock.

Having recognized the futility of releasing pen-reared birds, the newly formed Wildlife Commission began experimenting in 1947 with wild turkey refuges, large parcels of land where management was devoted to wild turkeys. These refuges were located at the Orton Plantation near Wilmington, the Uwharrie Mountains, Caswell County and two locations in the Sandhills—one in Richmond County and another in Scotland County.

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These refuges were to function in a similar manner as our current bear sanctuaries.

In a Federal Aid Quarterly Progress Report in October 1949, biologist Robert J. Wheeler Jr. wrote, "The primary purpose is to develop and manage each area so as to procure a maximum density of wild turkeys and thus provide a perpetual reservoir that will yield a substantial and sustained surplus of these birds for harvest in the surrounding territories by sportsmen." Later, at least some of these refuges were used as sources for trapping birds for relocation to restoration sites.

Although the idea held promise, the reality was that the commission was unable to grow and trap enough birds to restore the population, although the Caswell Refuge continued as a trapping source until 2005. Mike Seamster, the commission's wild turkey project leader since 1987, remarked in his "History of Wild Turkey Management in North Carolina" that "By the 1960s, turkey numbers on many of these areas had dwindled to the point that it was somewhat of a misnomer to call them turkey management areas." The problem was not so much one of habitat, as biologists would discover, but of habit. And the habit was fall turkey hunting.

"North Carolina, as most states did, had a long tradition of fall turkey hunting," Seamster said. "There was a lot of pressure from those longtime turkey hunters to keep that fall season. That's just the way you hunted turkeys." Even as biologists — and hunters — recognized that turkey populations were falling, North Carolina hunters enjoyed a season that in many years was nearly three months long and carried a season bag limit that once reached six birds (1948–49). The season limit was trimmed to three birds the following year, then dropped to two for the 1954–55 season. It remains two to this day.

FALL HARVEST PROBLEMS

Beginning with the 1948–49 season, hunters could kill only gobblers, the first time they had been so restricted since statewide regulations were instituted in 1929. As biologists would discover, however, eliminating hens from the legal fall harvest did little to aid turkey restoration. "With young birds, it is difficult under hunting conditions to tell the difference between a jake and a young hen," Seamster said. "A lot of the young hens were getting killed anyway, despite the fact it was a gobblers-only season. That has been proven to be the case in all of the states that have had a fall season. Those hens are going to get killed, and either put in a stump hole or sneaked out of the field. We now know the fall season might as well be either sex."

The problem was that anything above a 10-percent harvest of hens during the fall would prove to have long-term deleterious effects on turkey populations. A harvest between 5 percent and 10 percent would begin to stabilize the population. States that do allow fall turkey hunting try to maintain the hen harvest at 5 percent or less. Although shooting 10 percent of the female population during the fall would seem to be of little consequence, hens already have high mortality in the spring. The females typically lay 10 to 12 eggs over a two-week period and incubate them for 28 days.

"The hens have a lot of pressure on them," Seamster said. "They're nesting on the ground, and when they start incubating those eggs, they're on the nest basically 24 hours a day, leaving only for short periods of time to feed or for water. At night, on the ground, they're very vulnerable to predators, be it a dog, fox, bobcat or coyote. Different studies have shown losses of 25, 35, 40, even 50 percent of the hens during the nesting process. There's not a lot of margin for error. When you start placing additional mortality on those hens with a fall season, you can take a few of them, but if you take very many, with the losses that already are occurring with them, you'll see some population declines."

Decline was the key word for North Carolina, where the wild turkey population was seriously depleted by the late 1960s. Clearly, if the commission wanted any wild turkeys, it would need to abolish the fall season and adopt a spring, bearded-turkey season, which is considered the most biologically conservative harvest strategy. Because male turkeys are polygamous, have usually bred before hunting season begins and contribute nothing to rearing poults, removing some of the gobblers will not harm the population.

The commission began experimenting with a spring gobbler season in 1969, much to the dismay of hunters. In 1970, the commission hired Wayne Bailey, a retired wild turkey biologist from West Virginia, to lead the restoration program. Bailey, who has attained near-legendary status among hunters and biologists, was instrumental in abolishing the fall season, the last of which was in 1970–71.

"I've got old letters sent to Wayne Bailey and the commission from well-heeled, well-connected turkey hunters who are adamantly, vehemently opposed to a spring turkey season," Seamster said. "You had all these different arguments against the spring season. 'You're going to wipe out what birds that were left. They're no good to eat at that time of year, anyway. They're going to taste like wild onions.'

"They wanted to ride Wayne Bailey out of town on a rail. Do away with a fall season and establish a spring season? I mean, it was one heck of a battle to get it done. You didn't hunt turkeys in the breeding season. That was idiotic. That was the way those people felt, and some of them were very powerful politically.

Turkey restoration efforts began in 1928 and did not end until 2005. The end of fall turkey hunting was a giant step toward the species' recovery.

NCWRC

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They did not want to lose their fall hunting. It was a passion with them."

ROAD TO RECOVERY

The end of the fall season was a giant step toward the recovery of North Carolina's wild turkeys. Although the commission had been relocating turkeys since 1953, when nine birds were released on the Flattop Wildlife Management Area in Yancey County, progress had been very slow. From 1953 through 1971, only 220 birds were relocated, all but 26 of them having been trapped inside the state.

By the end of the 1970s, the state's wild turkey population numbered about 7,500 birds. To that point, all of the turkeys had been released on public lands in the western part of the state. The commission felt an obligation to restock public lands first since wildlife in our state is a public trust — it is owned by all the people. As for why all the relocations were in the west, there a bit of a misconception came into play. Many of the wild turkeys left in the state in the middle of the 20th century were in remote areas of the mountains. The reasoning followed that old-growth habitat must be what they required.

"Back in the '70s, Bailey felt that the future for the turkey was in those vast, remote wilderness tracts in the mountains, and that the turkey was ultimately doomed in the Piedmont and Coastal Plain," Seamster said. "But as we got those better sites stocked, or what were considered better sites at the time, we started trying birds in what was considered marginal habitat. The birds did extremely well. We said, 'Hey, if they're doing good there, then we've got a whole bunch more habitat that looks just like it over here.' We gradually realized that birds were able to do well in what a few years ago wasn't considered turkey habitat."

With improved tools in the 1980s — rocket nets and more refined capture drugs — the commission was able to release 943 birds during that decade, including 808 trapped and relocated within the state. The total turkey population reached 28,000 birds. Releases also began to be made on private lands during this period.

When Seamster took over as turkey project leader in January 1987, the program was on the verge of jumping into high gear. The reasons for acceleration were several, but two were primary. The first was a matter of success begetting success. As the commission relocated more birds that established themselves around the state, biologists had a larger reservoir of turkeys to trap. The second reason came from outside the Wildlife Commission — the Super Fund program of the National Wild Turkey Federation. Established in 1985, the Super Fund was comprised of money from Turkey Federation chapter fund-raising banquets, plus public and private donations. North Carolina eventually would receive more than $300,000 from the program for restoration.

"In 1989 we got the very first birds from out of state through the Super Fund program," Seamster said. "I remember thinking when we first started talking about getting birds through that program that if I had a million dollars to play with, we could accelerate this whole thing. It was kind of a pipe dream then. Some 10 or 12 years later we had spent over $930,000 on out-of-state birds. It practically doubled the number of birds that we moved in the '90s, and we were already moving more than we had previously because we had more areas to trap. Not only did we increase the number of birds that we moved, but we doubled that by getting all of those out-of-state birds."

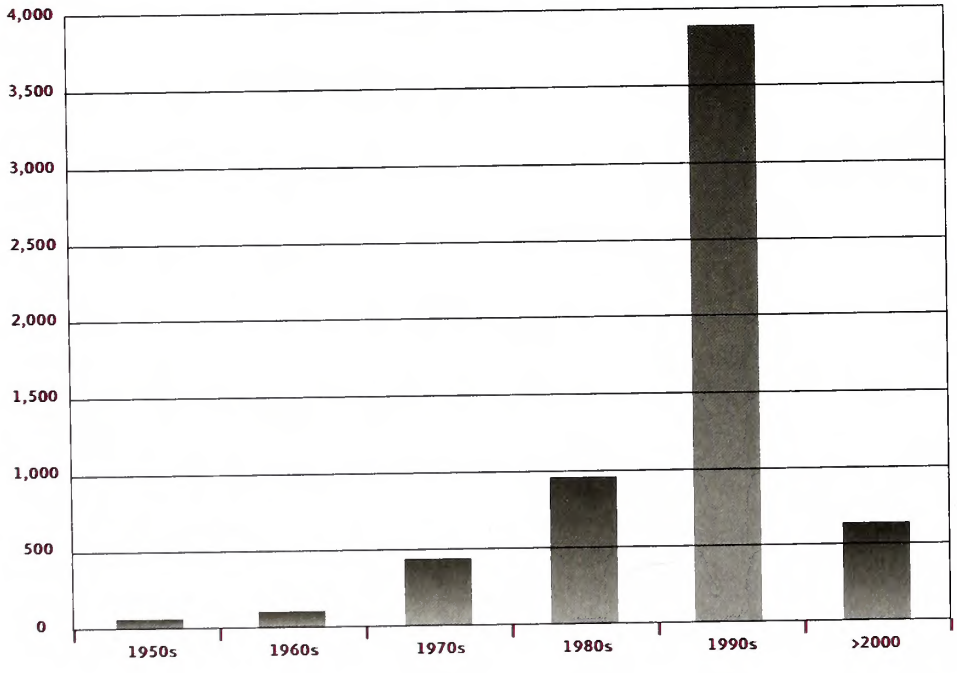
The turkeys came by air or by land from a number of states, South Carolina, Wisconsin, West Virginia, Pennsylvania, Iowa, Michigan and Alabama among them. Taking possession of the birds and then hauling them to release sites meant a hectic schedule and long hours on the road for Seamster and other staff. The entire restoration effort, from figuring out which areas were suitable for releases to obtaining agreements with private landowners to trapping the birds, was so massive that it eventually involved almost every biologist and technician within the Division of Wildlife Management.

Turkeys, whether from North Carolina or elsewhere, had to be released quickly. Like other wild animals, turkeys do not take well to being confined within a box. Thus the quicker the birds could be on-site and released the better. "We tried not to hold the birds over more than one night," Seamster said. Even birds that were trapped in Wisconsin, Iowa, Michigan — these states that are a long ways from us — were usually not held more than one night."

PRIVATE LANDS, PUBLIC GOOD

Despite some initial misgivings, restorations on private lands were proceeding extremely well and further aided in rebuilding the turkey population. One of the first such releases was at Biltmore Estate near Asheville. The commission released 15 birds there and returned to the site periodically to trap several hundred turkeys for release elsewhere. "A lot of people felt when we put birds out on private land we were really taking a chance on them being poached," Seamster said. "What happened was just the opposite. When we took those

WILD TURKEY RESTORATION BY DECADE



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Mike Seamster, with wildlife officer Mitch Kuykendall (above left) and NWTF's James Earl Kennamer (right) has guided turkey restoration since 1987.

landowners out there for a release — and we tried to do that on most of our sites — typically the first bird out of the box we would put in the landowner's arms and say, 'You release this bird.'

"It made them a part of the whole process. He felt connected to it, and if anybody messed with those turkeys, they had to answer to him, more so than even the game warden. He'd put out the word: 'You'd better not shoot my birds.' "

During the decade of the 1990s, Seamster oversaw the stocking of 3,845 wild turkeys, more than half of the birds than would be relocated during the life of the entire program. The state's turkey population soared to 130,000, an increase of more than 100,000 in the span of 10 years.

The commission completed its initial restoration efforts in 2000. From 2002 to 2005, biologists filled in pockets of habitat turkeys had failed to occupy through natural expansion, relocating a total of 409 additional birds. The last releases took place on Feb. 24, 2005, in Pamlico, Duplin and Union counties. Fittingly, stewardship biologist Vic French, for years one of the commission stalwarts in trapping turkeys, captured the last few hens needed for the Pamlico and Union sites. The restoration of the wild turkey in North Carolina was complete, some 78 years and 6,031 releases after it began.

"Our goal all along was to restore turkeys to all suitable habitat in the state," Seamster said. "What we didn't understand was that almost all the state would be suitable. In 1976, Wayne Bailey had written that the ultimate objective of the program was to have a population of 20,000 and an annual spring harvest of 500 to 1,000 birds. I don't think anybody really realized that we would have birds in all 100 counties, and the population is still growing. Our thoughts on what was really habitat changed over time." Each year, we'd say, 'OK, this is what we've got left to work with,' and we'd get all of that stocked and we'd have even more areas to stock."

What's next for the wild turkey in North Carolina? The commission's biologists will examine possible changes to the spring and winter seasons and manipulate the population through management. "The traditional thinking is that at some point, when all the habitat that supports birds is filled and habitat is being gobbled up by development, the turkey population is going to peak," Seamster said. "From that point we would have a gradual decline consistent with the decline in available habitat as development takes its toll."

Is that necessarily the scenario that will unfold? Seamster recalled that in the 1970s, biologist Henry Moseby noted that wild turkeys had proven more adaptable than anyone working with them in the 1950s would have believed. "Here it is 2006, and we're saying the same thing again. In 20 or 30 years, what are we going to be saying?

"I had a guy who manages a golf course near Asheville call me and say, 'We've got two flocks of turkeys out here. One's got 40 birds in it, and the other's got over 50. They're up and down the fairways all the time and digging up people's flower beds.' Turkeys become acclimated to people in those urban situations, and they're doing fine. Will turkeys become like white-tailed deer and Canada geese? Who would have thought we'd have geese in parks all across the state?"

The restoration of the wild turkey throughout its original range and beyond is one of the great wildlife management success stories. The population was nearly extirpated in North Carolina, but now supports an annual harvest of about 10,000 birds and both spring and winter seasons. The turnaround from a population of 2,000 birds just 36 years ago to about 150,000 today is dramatic and laudable, involving as it did habitat conservation, cooperation between public and private sectors and intense effort from wildlife managers adaptable enough to adjust their strategies as they learned more about what the wild turkey was — and what it was not. ◆

Jim Wilson is associate editor of Wildlife in North Carolina *magazine.*

Destination Tyrrell

For paddlers at Palmetto-Peartree Preserve, both wildlife and recreational opportunities abound. | *written by Mike Marsh* | *photographed by A. Mack Sawyer*

Paddle blades made soft splashes as a trio of canoes floated along a winding blackwater stream. The occasional scrape of a tree limb along a gunwale punctuated the sound of the gentle strokes. In the stillness, the resulting screech seemed as loud as fingernails raked against a blackboard. These telltale sounds hinted that human beings had once again found Hidden Lake.

"I gave up fishing and hunting years ago," said guide Don Gray. "A rod or a gun became just another burden to carry besides a paddle. I just enjoy paddling and seeing pristine settings. Hidden Lake is one of the prettiest."

Hidden Lake is a tiny speck on the map compared to the 10,000-acre Palmetto-Peartree Preserve, but it may be the crown jewel. Those involved with the preserve are hoping the lake and a system of paddle trails and hiking trails will bring plenty of ecotourists to the area. The preserve, which is home to a population of endangered red-cockaded woodpeckers, is located in Tyrrell County, which has the lowest per-capita income of any county in North Carolina. Dollars from low-impact tourism would help buoy the local economy.

Gray operates two businesses. He runs his Natural Adventures paddling operation out of Fayetteville, outfitting float trips from Florida to Alaska. But since his home is eastern North Carolina, he runs most of his trips at local waterways, including the Black River, Roanoke River and salt marshes and sounds along the Outer Banks. His other business is named Creative Habitat. "I like to build creative places to live," he said. "I was lucky enough to get the contract to build the camping platform at Hidden Lake."

Combining the two businesses is what brought Gray to the edge of Albemarle Sound. After a short paddle from a launching point on private property, the canoes reached a narrow pathway leading into the cypress and black gum trees lining the shoreline of the narrow, 8-acre lake. The party shucked shoes and pulled on hip boots before walking the muddy path ending at a platform taking shape in the trees. The wooden skeleton, consisting of treated lumber set atop 4-inch-by-4-inch pilings driven into the muck, was Gray's handiwork. He had landed the job of building a dry place for campers who want an unimpeded view of the stars while they spend the night.

Gray watched a red-shouldered hawk wheel overhead, scanning the swamp for a small animal to capture. He has observed lots of wildlife in the relatively untouched setting.

"I've been watching an active osprey nest in the woods behind the platform, and I've also seen lots of green herons," he said. "Neotropical warblers are everywhere. It's also a great place to see frogs and snakes. There are lots of deer and black bears. I saw a mother and her cub just the other day. The bears chew on the salt-treated wood used for the signposts throughout the preserve, and I suspect they will also damage the platform once they find it."

MELISSA McGAW

The walking trail decks at Palmetto-Peartree can lead to little wonders along the way, such as this six-spotted fishing spider and green tree frog.

The preserve has both a launching/fishing platform (top) on the sound and a camping platform at Hidden Lake. Biologist Ryan Speckman (below) scales a loblolly pine to inspect a nest of the endangered red-cockaded woodpecker.

There are plenty of animals under the water as well. Anyone familiar with fishing the tannin-stained coastal rivers and streams will have no problem landing the foundation for a fish dinner while visiting the platform. A couple of casts with an ultralight spinning rod brought to shore a native black crappie weighing more than a pound. Largemouth bass engulfed dragonflies that flitted across the water, and sunfish sucked down insects wriggling on the glass-slick surface.

Croakers, spots, flounders and blue crabs also are abundant along the edge of Albemarle Sound. Farther east, brackish-water species give way again to freshwater species along the Alligator River. There is a launching point for powerboats near the creek's headwaters at Newfoundland and another downstream at Fort Landing. A launching point into the Alligator River is located at East Lake Landing on the east side of the U.S. 64 bridge.

Paddle visitors to Hidden Lake will take a scenic route that begins at a public launching point where Navy Tower Road ends at the shoreline of Albemarle Sound. The preserve has over 15 miles of shoreline along Albemarle Sound. The entrance to Hidden Lake is at a small stream leading from the sound through the trees, located 1¼ miles west of the launching point. It will be marked with signs so campers can find the platform without difficulty.

"I have been to Palmetto Point and Peartree Point," Gray said. "There are no palmettos at Palmetto Point or pear trees at Peartree Point. I haven't found out why they were named that way."

Construction and materials costs for the camping platform at Hidden Lake were funded with a grant from the Anheuser-Busch Keep It Natural Carolinas program. Through the program, which is aimed at raising awareness about the importance of good environmental stewardship, a portion of sales from some of the company's products is donated to The Conservation Fund in support of its land protection efforts. Since its inception in 2000, the Keep It Natural Carolinas program has conserved more than 57,500 acres in North Carolina and South Carolina.

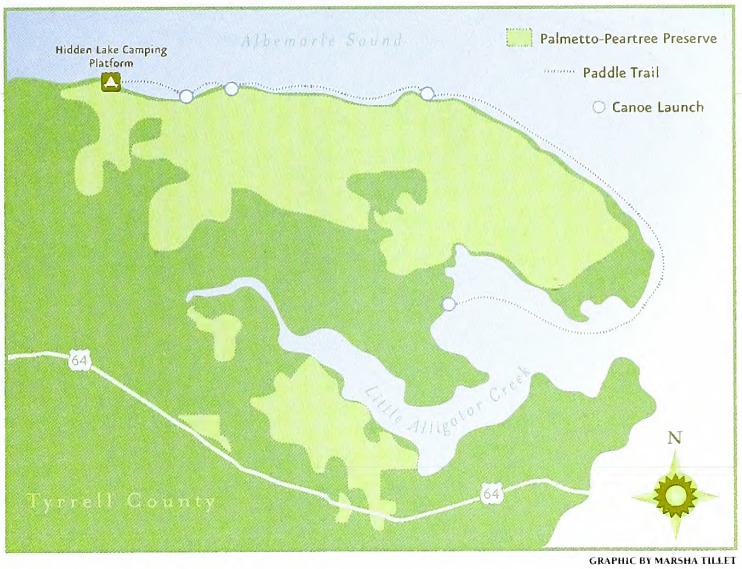
Jessica Metzger, The Conservation Fund's Palmetto-Peartree Preserve manager, was in one of the canoes touring Hidden Lake with Gray. She said obtaining funding for the camping platform had been one of the preserve's highest recreational priorities.

"Besides the $10,000 we received from the Keep It Natural program, we also received a grant of $5,000 from the State Parks Adopt-a-Trail Program. "Once the platform has been completed, the platform and the Palmetto-Peartree paddle trail will be added to the Roanoke River Partners paddle trail system. It's most likely that reservations for the Hidden Lake camping platform will be made in the same fashion and cost the same as the other platforms on the Roanoke River trail."

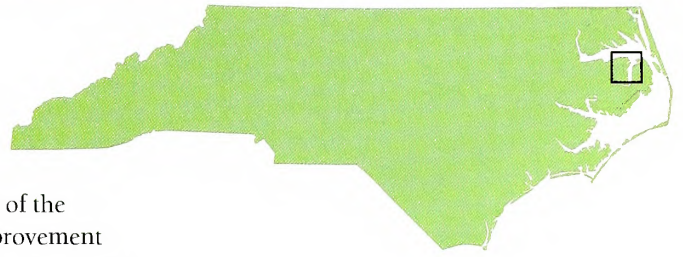
Across the preserve's more upland areas are thousands of acres of old-growth loblolly pines. Covering large, unbroken expanses, the forests are the essence of the preserve's existence. A unique population of endangered red-cockaded woodpeckers inhabits the pines, and protecting them is a top priority from the standpoint of both the state and federal governments.

"The preserve was acquired for $16.3 million by the N.C. Department of Transportation (NCDOT) in 1999 as a mitigation site to compensate for road construction activities," Metzger said. "It was dedicated to The Conservation Fund, which now owns and manages the preserve. We have a memorandum of understanding with the U.S. Fish and Wildlife Service. They enforce the Endangered Species Act and approve the management of timber and other resources to make sure there's no negative impact on the red-cockaded woodpeckers. We had 23 red-cockaded woodpecker (RCW) clusters

DERRICK HAMRICK



GRAPHIC BY MARSHA TILLET



when the property was first acquired, and that number has grown to 28 clusters. Increasing the number of clusters is the major purpose of the preserve."

Wildlife biologist Ryan Speckman, employed by a private consulting firm in Southern Pines, spends 60 to 70 hours each week monitoring the RCWs. Each woodpecker has its own nest cavity, pecked through the bark and into the heartwood of a pine tree. The birds form extended family groups, with several successive generations caring for the brood of a single breeding pair. In the nutrient-starved forests of old-growth pines, it does indeed take a village, or in this case a cluster, to raise offspring. It is too difficult for a single set of parents to find an adequate supply of food to feed a growing family.

Speckman finds new family clusters by riding the roads and walking the trails, watching for light-brown rings of pecked inner bark on pine trees indicating the construction of a new nest cavity is under way. Holes ringing the tree near the entrance to a nest cavity allow sticky sap to run down the tree trunk. The theory is that the sap prevents snakes from climbing the tree to enter the nest cavity and prey on the woodpeckers and their eggs. Each spring, Speckman removes every hatchling from its nest cavity, places a band on its leg and returns it to its relatively safe home.

"The significance of this population of RCWs is that they nest in loblolly pines in a forest with a high-growth understory," he said. "All other populations nest in longleaf pines with a low-growth understory. The other RCW sites are mostly in the Sandhills. Those are managed by fire to keep the understory low."

At the preserve, biologists are unable to use fire to thin the understory because the ground is too wet and organic. Some mulching has been done with machinery to thin the vegetation in hopes of improving the habitat in favor of the woodpeckers. But habitat improvement comes grudgingly. Along a wooden boardwalk that serves as a hiking trail west of Navy Tower Road is a stark reality. Southern pine bark beetles infested 500 acres of loblolly pines that once served as red-cockaded woodpecker nesting habitat, highlighting the precariousness of the bird's situation.

The beetles found the weakened trees, which were stressed by saltwater intrusion created by a hurricane, then killed them in a short time. The only answer to such large-scale infestations is to cut down the trees. Although replacement trees have been planted, it will take 60 to 80 years for them to become potential nesting trees. The loss of all that loblolly would not be a problem in other parts of the woodpeckers' range. The unique habitat requirement of the Palmetto-Peartree birds has scientists scratching their heads, trying to decide whether it meets the criteria for designation as a separate subspecies.

In 2008, the preserve will be turned over to the U.S. Fish and Wildlife Service and become part of the National Wildlife Refuge system, perhaps included with the nearby refuges at Alligator River or Pocosin Lakes. Until that time, operating funds will continue to come from NCDOT, timber sales, hunting club leases and leases for a few commercial fishing vessels anchored along one of the canals leading to the sound. Boardwalks and other walking trails have been funded through the Adopt-a-Trail program. Signage and other infrastructure costs have been met by NCDOT.

Except for reservation requirements for overnight campers at the Hidden Lake platform, anyone can visit Palmetto-Peartree Preserve at any time. Everyone involved with the preserve is hoping the recent upsurge in ecotourism interest will bring visitors to Tyrrell County.

"In the beginning, there was concern by the county government about removing such a big land area from the tax base," Metzger said. "Back in 2000, ecotourism plans were laid out by representatives of The Conservation Fund and local, state and federal governments. Local citizens and business owners were included in the planning process. The Conservation Fund agreed to keep paying county taxes. Everyone agreed to promote ecotourism to help the local economy and increase public awareness about the preserve."

The plan appears to be working, at least from the local point of view. "When I first started coming here to work on the platform, one of the local residents eyed me suspiciously when I paddled past," Gray said. "He asked if I was 'one of those environmentalists,' and I told him I was. Now, when I meet him, he smiles. The local people know we are not trying to take something away, but to bring in other outsiders to share in the beauty of their area."

Wilmington writer Mike Marsh is a frequent contributor to WINC.

MELISSA McGAW

Fossil Fever

written by **Helen Correll**

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From top to bottom: the sea biscuit-like *Echinolampas appendiculata*, a tooth from a *Carcharocles auriculatis* shark and the cephalopod *Eutrephoceras carolinensis*. Opposite page: a display case known as a Riker mount full of fossilized shark teeth.

ERIN WHITTLE

This enjoyable affliction causes its sufferers to hunt and dig relentlessly. Collecting old teeth and bones seems to bring some temporary relief.

The symptoms of fossil fever are numerous: fossils in your pockets, fossils in your car and fossil field guides by your bed, to name a few. In general, it's a fascination with holding pieces of prehistoric life in your hand. If you catch it, there's only one prescription—a regular dose of fossil hunts.

The most enjoyable course of treatment is to hunt for fossils with a friend. Even better is hunting with a group of friends who are knowledgeable in the field of paleontology and who know the history and layout of the site you're searching. Friends like this can be found in the North Carolina Fossil Club.

I have loved fossils since college and have gathered a sizeable collection of Pleistocene fossils from beaches of the Southeast: whale vertebrae, glyptodont scutes, turtle plastrons, horse and bison teeth, and even a small mammoth tooth. I have grand visions of becoming known as "the Mary Anning of the 21st century" and, like the accomplished 19th-century British fossil hunter, finding the complete fossil of a new species. Yes, I have fossil fever.

My friend Mary Walter accompanied me to the Martin Marietta Materials quarry in Castle Hayne, near Wilmington, for a fossil hunt organized by the N.C. Fossil Club. This quarry extracts limestone from an outcrop called the Castle Hayne Formation. The formation, rich in marine fossils, is also rich in history. The famous British geologist Sir Charles Lyell visited the site in 1841 during his first visit to America. As part of his study of the geology of the New World, Lyell collected Castle Hayne fossils to take back to England. During the visit he identified several new shell species and even named one for Wilmington.

Lyell was famous for his book "Principles of Geology" (1830), in which he promoted the theory of uniformitarianism, proposing that the earth was millions of years old and had evolved slowly over time. This idea went against the beliefs of the many geologists and religious thinkers of the time who believed in catastrophism, which agreed with Earth's biblically derived age of 6,000 years and stated that the earth changed in sudden upheavals.

Through his long study of fossils, Lyell determined that one could establish the age of rock strata by using the type of fossils found in the rock as an indicator of its age. After studying the fossils of Castle Hayne along with fossils from France, Italy, Sicily and the Canary Islands, Lyell proposed dividing the Tertiary period into three parts, which he called epochs. These he named Eocene (dawn of recent), Miocene (less of recent) and Pliocene (more of recent), terms we still use today. Charles Darwin carried a copy of "Principles of Geology" on his five-year voyage aboard the *Beagle* and used Lyell's findings about fossils in developing his theory of evolution.

The Castle Hayne Formation dates to the Eocene epoch (40 to 50 million years ago), when the Coastal Plain of North Carolina was covered with a shallow, tropical sea. Animals in the sea died, collected on the ocean floor and were eventually buried by layer upon layer of sediment and shells. Time and great pressure cemented the particles into rock. Today, Castle Hayne limestone is well known for containing one of the world's most diverse collections of marine fossils, from lowly bryozoans to the bones and teeth of whales.

Outcrops of the Castle Hayne Formation are found in counties other than New Hanover, including Brunswick, Jones and Pitt counties. In the Report of the Geographical Survey from 1875, state geologist W.C. Kerr reported smaller exposures, called outliers, even farther west in Wake, Harnett, Johnston and Moore counties. Kerr was the first to declare

ERIN WHITTLE

that "discovery of the outliers carries the Eocene seas quite into the hill country of the state and nearly 150 miles from the present coastline."

In Lyell's footsteps

Members of the N.C. Fossil Club gather in the shade of loblolly pines in front of the quarry office. The club president, Cindy Muston, circulates through the group. There's a lot of fossil talk going on—who found what, and where. Cindy pulls two sharks' teeth from her pocket to show us what she and another member, Bobby Tant, recently found in a Greenville stream. Bobby smiles as Cindy shows off the teeth, which are 2 inches long and sport sharp serration along their edges. Bobby carries a collection of teeth from various species of huge sharks.

John Everette, our trip leader for the day, hauls a cardboard box to the base of a pine and unloads four collection boxes (known by collectors as Riker mounts), each displaying several rows of 3-inch shark, whale and other teeth in rich shades of brown and gray. We all crowd around to admire and ask questions about them. He says they are from this mine and a neighboring one. In other words, we could find teeth like this.

A retired architect, John became interested in fossils in 1975 after his wife signed him up to accompany their daughter on a fossil hunting trip to New Bern with the N.C. Museum of Natural Sciences. He wasn't sure about the trip, as he knew nothing about fossils, but it must have been in New Bern that he caught fossil fever. In 1977 he helped found the N.C. Fossil Club.

MELISSA McGAW

John calls our attention away from the sharks' teeth to attend to the first order of business: making sure everyone signs a waiver relieving the mine of any responsibility for our safety. Fossil hunting in a quarry is not for the faint of heart, and John does not hesitate to get this point across.

MELISSA McGAW

Top: Members of the N.C. Fossil Club walk down a road at the Martin Marietta mine; a wide view of the site. Left: a tooth from an Archaeocete whale and the brachiopod *Plicatoria wilmingtonensis*.

"This is the most dangerous mine in North Carolina," he says. "The hillsides are steep and covered with loose gravel. They can give way at any time, so be careful. Also, stay away from the far side of the mine because there are alligators. Snakes live in the rocks as well, so watch your step." There is mumbling in the group, and some of us cast worried glances at each other. As an aside, John says, "Well, you probably won't see the gators and snakes. They'll be hiding because they don't like the dynamite blasts."

Everyone laughs as he reassures us that the Martin Marietta quarry allows fossil hunting (with permission only) on Thursdays and Fridays, days the mine doesn't use explosives. "But watch for the huge pit trucks that transport rock to the processing plant," he tells us. "This mine belongs to them. Stay out of their way!"

One by one, our cars fall behind John's as he leads us into the heart of the mine. Mary and I have hunted fossils only on beaches and riverbanks, so when the quarry comes into view, we're surprised. We agree it feels like we're driving on the moon. Our parade of cars finally comes to a stop on the mine floor.

The floor is where the mine is dug deepest, so in geologic terms we are standing in the Cretaceous period (66 to 85 million years ago), looking up at cliffs of Paleocene and Eocene rock. Surrounding us are piles of soil and blasted rock that were once layered over the limestone. Some piles are old, settled by years of weather; others have been recently dumped. Mary and I get out of our car and grin at each other. This is our first time fossiling in a mine, and we feel a bit feverish!

Mary and the others vanish in the moon-like surroundings, and I approach John to ask a question. Within two minutes, a club

ERIN WHITTLE

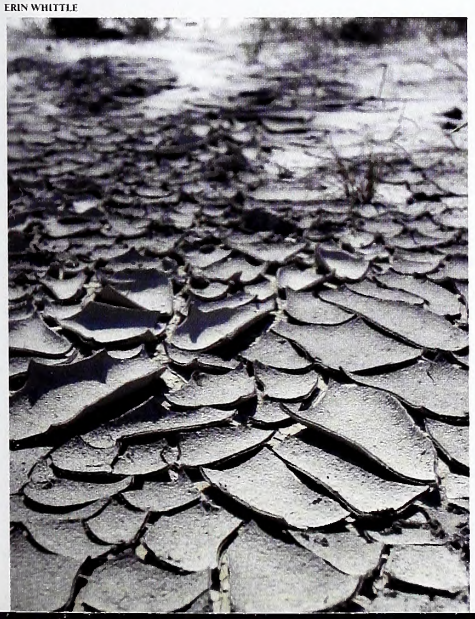
member runs up to us with his first find of the day: an inch-long tooth of a mosasaur, a large, predatory, lizardlike marine creature. "I found it lying right there," he says as he points to a pile close to where we'd parked. John is excited. He tells us the mosasaur lived in the Cretaceous period. The tooth is over 65 million years old. "This could be the best find of the day!" he said. John turns to finish answering my question, but now I can barely remember what I'd asked. My mind is on mosasaur teeth.

Instead of a mosasaur tooth, I find several small sharks' teeth and a small vertebra imbedded in a boulder, which I have to leave. When I find a 3-inch mold of a mollusk, also in a large boulder, I resolve to add "rock hammer" to my short list of fossil hunting equipment. Fossiling on a beach or riverbank requires nothing but pockets for sharks' teeth and a backpack for larger finds.

A pocketful of sharks' teeth

Later, as I work my way around a pit of sticky mud, I hear the clink of a tool falling down rock. I look up to see Mary, high on the side of an eroding cliff, clinging to the rocks with one hand and picking at the exposure with the other. Her walking stick lies at the bottom of the rock face. "You all right?" I yell. "Yeah, I'm fine," she replies. "OK," I yell back, thinking Martin Marietta had good reason to ask us to sign that waiver.

ERIN WHITTLE



I leave Mary and head for a hill of yellowish Eocene material dotted with club members. I'm about to cross the road when I hear and feel a pit truck coming. Moments later, a gigantic truck with tires twice my height comes barreling around the hill. Two stories up, a man in a boxy cab drives the monster hauler past me, stirring up billows of fine dust.

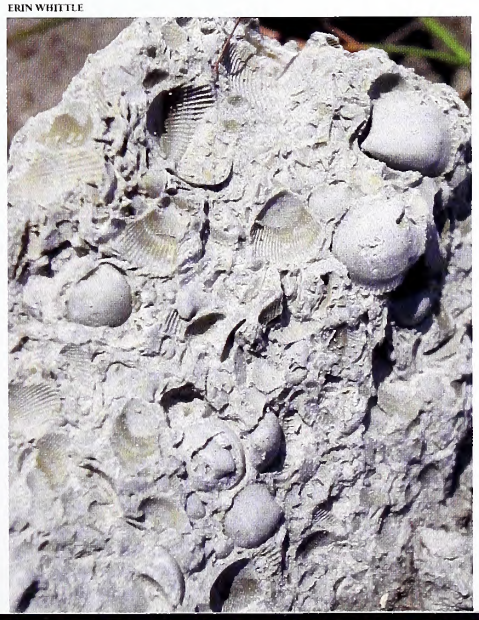
I dash across the road, where Bobby digs out a handful of specimens of the brachiopod *Plicatoria wilmingtonensis*, originally discovered here in the 1840s by Lyell. John is talking to Cindy, who is cradling something wrapped in a white bandana. She unfolds the cloth to reveal her treasure: a 3-inch-long ridged shell. It's a nautiloid, a marine animal with a large head and tentacles, that swam the seas of the Eocene epoch. It died about 50 million years ago, fell to the bottom of the sea and was covered in mud and sand to be preserved in the Castle Hayne limestone.

After admiring the nautiloid, I show two sea biscuit-like fossils I'd found. John points to the one that is clean. "This is a common echinoid from the Eocene, *Echinolampas appendiculata*," he says. Then he points to the one encrusted with limestone. "This one is a 'leavarite.' " I stare at the two fossils, and it dawns on me what he means. "So, you think I should leave it right here?" "Yep," he says. We all laugh as I toss the offending fossil.

Later, a small group is following John down a pine-lined road that opens to some fresh mine workings. Once again, my friend Mary disappears behind a huge hill of gravel. Her head pops up. "Hey," she calls, "If you're wondering where I am, I'm going to climb up this hill."

"OK," I say and then follow John downhill. He leads us around the base of the steep gravel piles. Here, heavy oyster shells have rolled out of the finer material. This shell, *Exogyra ponderosa*, is one of the index fossils Lyell used to date rocks to the Cretaceous period. Several of us are studying the shells when John calls, "Come quick!" He points to an insignificant mound of gravel covered in black specks. "This is full of small sharks' teeth," he announces. "You can get a pocketful."

ERIN WHITTLE



Sure enough, if you squat with your back to the sun, the shiny points of sharks' teeth are easy to pick out from the gravel. "This soil used to be the bottom of a Cretaceous river," John explains, "so some of these teeth have been tumbled quite a bit and are rounded on the edges. Every now and then you'll find a really nice one, though." I pick out a handful, and as I stand up, I see Mary scooting around the gravel piles with a grin on her face.

"OK, what did you find?" I ask. She doesn't speak but simply digs into her pocket and pulls out a 2-inch tooth. Then from her backpack she pulls out a vertebra about the size of a large can of tuna. "I don't know why," she says, "but I just kept climbing up that hill." She points to the piles I'd thought unclimbable. "I saw the point of the tooth and had to dig it out . . . and look at this vertebra!" John walks up and identifies it as Eocene, possibly from an Archaeocete whale.

Around 3 o'clock, club members begin showing up to tell John good-bye. This is both a courtesy and a safety issue. Being a trip leader requires keeping tabs on everyone. The hunt is over. But as Mary and I trudge up from the mine with John, covered in dust and loaded with heavy packs, Mary comes to an abrupt stop and points behind me. "Look what you just stepped over," she squeals. It's another 2-inch shark's tooth. I laugh, and John expounds on the shark this beautiful tooth came from—*Carcharocles auriculatis*—"a 'Ricky,' for short," he says with a smile.

As we drive away, I can't help but be thankful for Lyell, Kerr and other past state geologists and paleontologists, all of whom had fossil fever and passed it down to us. I'm thankful for the N.C. Fossil Club for opening doors to new and exciting experiences. Fossil hunts are brief, but the passion for fossils will be alive as long as humans are curious about the history of Earth. ◆

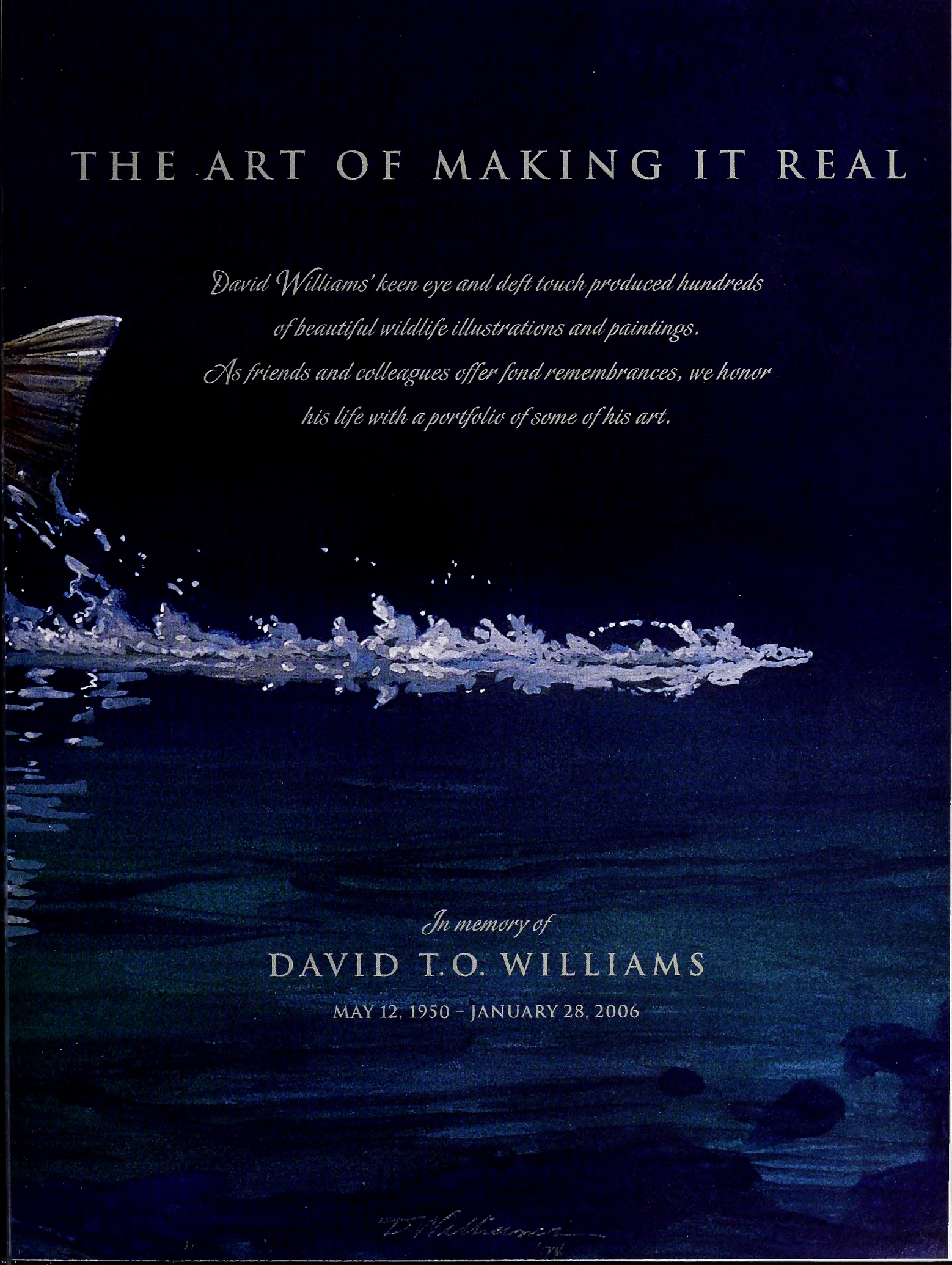
Helen Correll is an accomplished nature writer and illustrator living in Spartanburg, S.C.

Fossils, many of them encased in limestone, are often found in the dry beds of ancient rivers and seas.

This painting of a brown trout leaping from a stream was one of Williams' favorite pieces.

THE ART OF MAKING IT REAL

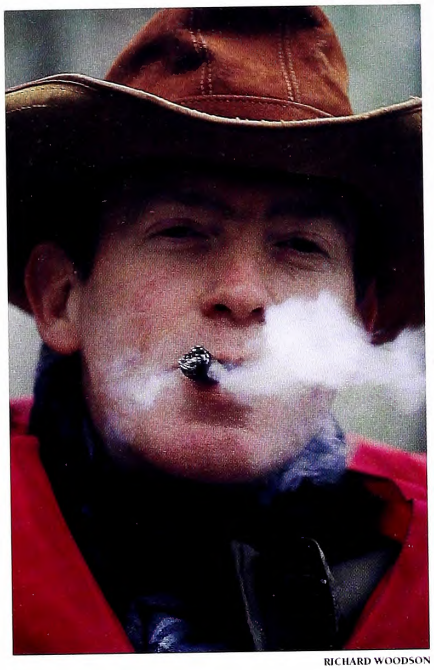
David Williams' keen eye and deft touch produced hundreds of beautiful wildlife illustrations and paintings. As friends and colleagues offer fond remembrances, we honor his life with a portfolio of some of his art.



In memory of

DAVID T.O. WILLIAMS

MAY 12, 1950 – JANUARY 28, 2006



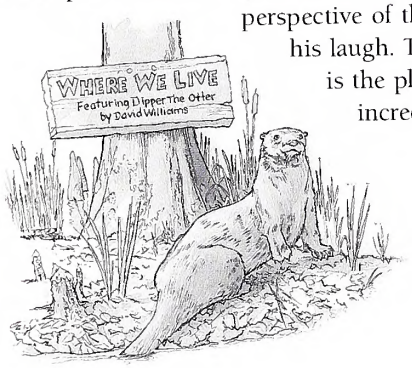
RICHARD WOODSON

HE WAS AN ARTIST, ILLUSTRATOR, EDUCATOR, designer, paddler, hunter, angler, lover of every aspect, large and small, of North Carolina wildlife and wild places. He was one of *Wildlife in North Carolina*'s most enduring icons—the magazine's designer from 1978 to 1987, artistic talent behind hundreds of Nature's Ways columns, the exquisitely thoughtful creator of hundreds more illustrations.

David Williams passed away, at his home of a massive stroke, in the dawn hours of the last day of the 2005–06 duck season, Jan. 28. He was 55. He died with his boots on, so to speak—his boots of choice being chest waders.

It is quite likely that Williams' work—be it in a copy of *Wildlife in North Carolina* or the magazine's beloved annual calendars, an art print from the N.C. Wildlife Federation, a book or brochure—resides in more North Carolina homes than the work of any other single artist in the history of this state.

Williams was a raconteur, a storyteller, a man in love with every moment of life. He could fill a canvas with the fervent vigor of nature, wild and sublime. He could fill a page with the disassembled parts of a flower, a fin, a tiny moment of forest or stream, a clockmaker's perspective of the natural world. He could fill a room with his laugh. The one space David Williams will never fill is the place in our hearts created by the loss of this incredible man.



–T. Edward Nickens

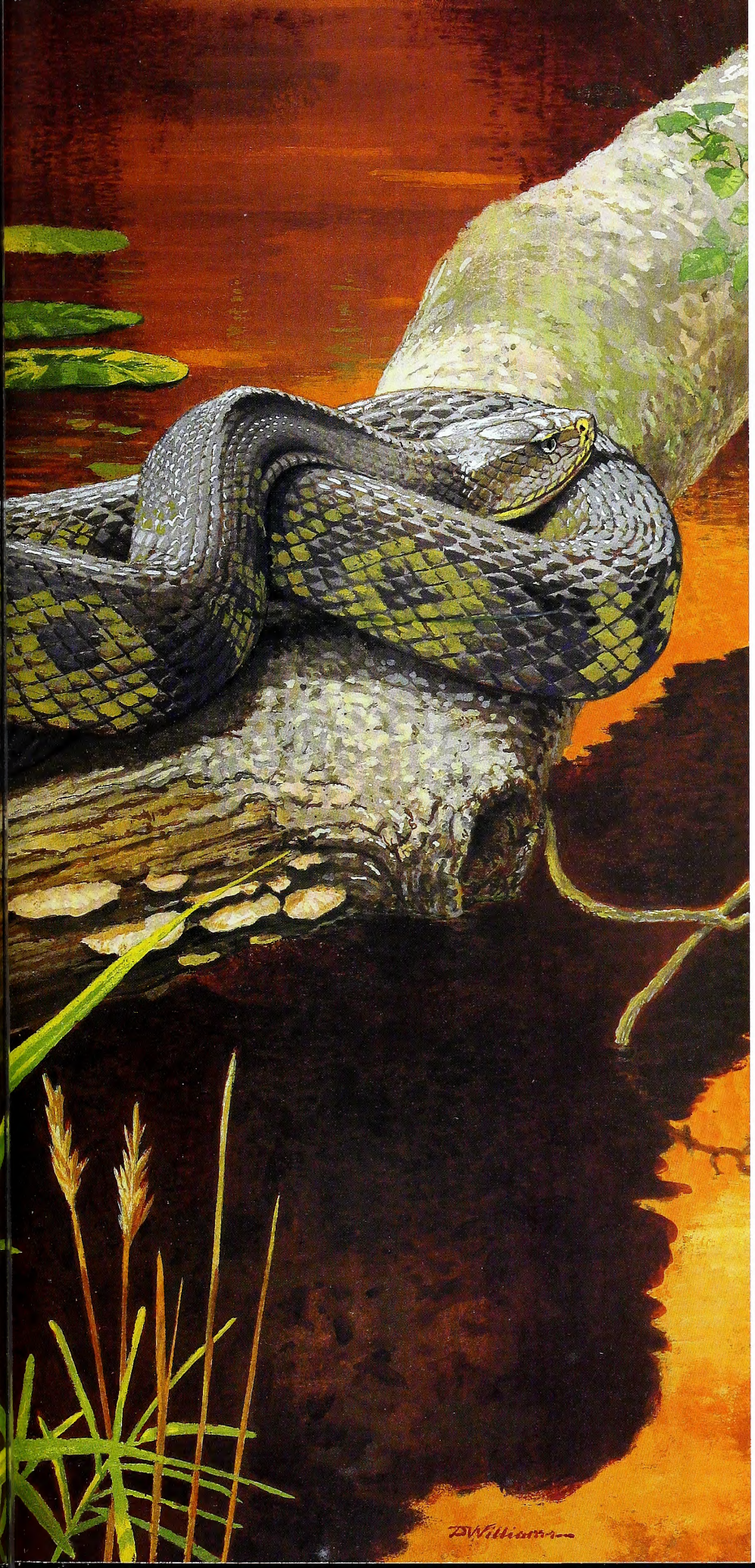
I WELL REMEMBER THE SEVERAL INTERVIEWS WE HAD WITH David when we were in hopes of luring him away from South Carolina's wildlife magazine. We had watched him shape that fine publication (which often took top honors in conservation magazine contests), and I was certain that he would do the same for *Wildlife in North Carolina*.

David's arrival was like a breath of fresh air, and he quickly stepped in with innovative graphic design ideas. But it took some "pointed suggesting" on my part to get him comfortable with doing actual artwork. Once that hesitation was overcome, there was no stopping him.

There will be no way to fill the hole in the fabric of natural history illustration that David left. I feel that I have lost more than a talented fellow artist; I have lost a friend.

–Duane Raver

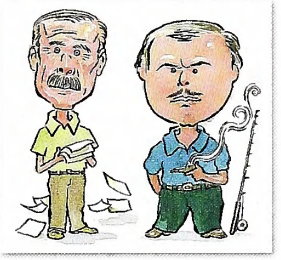
Williams created Dipper the Otter as the kids' mascot for the N.C. Wildlife Federation. "Stealing Up on Ducks" was a collaboration with Nickens for the December 2005 issue of *WINC*. This realistic cottonmouth was painted for the cover of *Wild Earth* magazine.



In 1976, Duane Raver, who was then editor of *Wildlife in North Carolina,* and I attended a magazine design workshop hosted by the staff of *South Carolina Wildlife.* At that time, *South Carolina Wildlife* was the handsome flagship of state wildlife magazines, and its art direction and full-color photography rivaled such national publications as *Audubon.* We were impressed, and Sid Baynes, the new chief of our Division of Education, shared our hopes that similar improvements could be made in *Wildlife in North Carolina.*

Clearly, we were going to need professional art direction, but we knew where to look. We hired one of *South Carolina Wildlife*'s best graphic designers and, in 1977, David Williams and his young wife, Mary, moved to Raleigh. David put his skills and fresh ideas to work redesigning *Wildlife in North Carolina.* Subscribers saw the initial results when they received the January 1978 issue, but that was really only the beginning.

Over the next nine years, David refined the magazine's layouts and appearance, winning numerous national awards. We soon discovered that David was also an exceptional artist, and his work appeared regularly, most notably in collaboration with the Nature's Ways series originated by Larry Earley. Although David left the staff in 1987 so that he could pursue a wider range of freelance opportunities, his illustrations have remained a regular part of the magazine.

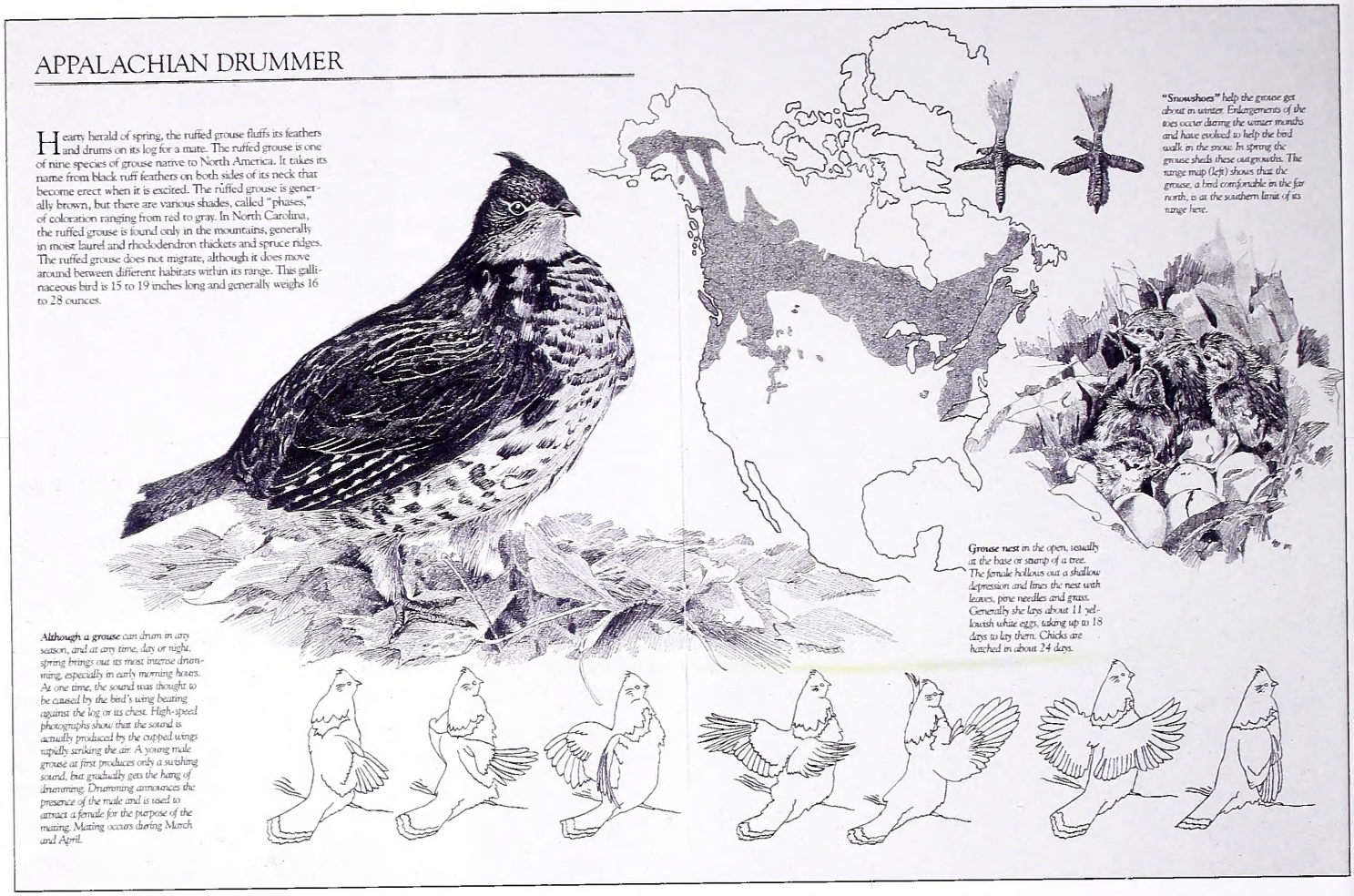


Earley (left) and Dean

There have been many talented art directors and graphic designers on our staff over the years, including Donnie Robbins, who followed David as art director in 1987 (and who sadly passed away last year). But David was the first, and his influence is still obvious to anyone comparing today's magazine with those first redesigned issues in 1978.

Yet, all this is simply history that doesn't reveal the warm friendship, wonderful wit and keen sense of the absurd that David shared with us each day. For him, a Monday morning staff meeting was an opportunity to surreptitiously whip up a devastatingly funny cartoon of a co-worker. No one was immune, and no one wanted to be.

–Jim Dean



DAVID WILLIAMS AND I WORKED closely for many years on Nature's Ways, the natural history column that has been an educational fixture in *Wildlife in North Carolina* since 1978. So it might be sheer bias on my part to say that of all his contributions to the magazine, David's extraordinary illustrations in Nature's Ways will be missed the most.

David produced hundreds of pen-and-ink, pencil and color sketches for Nature's Ways over the decades, an output that few other natural history artists in our time can match. He drew trout, red-cockaded woodpeckers, wolf spiders, white-tailed deer, mosquito larvae, tadpoles, dragonflies, diving beetles, cottonmouth snakes, caddisfly larvae. He drew the interior of a tree trunk, a leaf in cross-section, an orchid and its amazing honey trap. He drew complicated food webs, migrations of neotropical migrants, the role of mycorrhizae in the health of a forest.

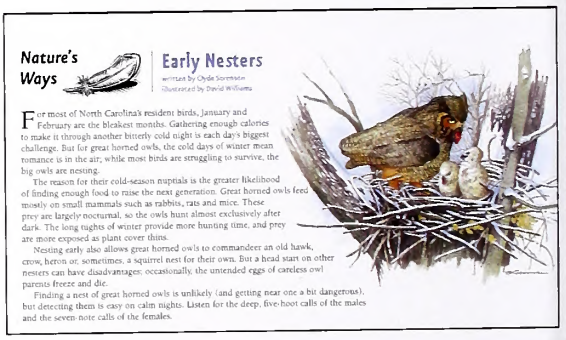
One of my favorite David Williams sketches is the pencil drawing of a ruffed grouse in "Appalachian Drummer" (April 1985). Light and well-spaced pencil strokes suggest the bird's light-colored breast feathers, while heavier strokes gradually hint at the darker coloration of wings and head. Yet every feather, no matter how dark, is clearly delineated.

Consider "The Amazing Egg" from April 1993, a tour-de-force of wolf spiders, terrestrial snails, trout, snakes and four other egg-laying wildlife species. Look at the Northern gannet in "Northern Exposure" (Dec. 1993) or the red-headed woodpecker (Sept. 1996), each of them brilliantly and accurately depicted.

There's no telling how much time David put into each of these works, but it was never the time that was important for him, nor the money—he often joked that we were exploiting him, and he was right. What was important was making something that seemed real enough to step, swim or fly off the page—and real enough to stop us in our tracks.

–Lawrence S. Earley

The evolution of Nature's Ways: "Appalachian Drummer" from 1985, "Early Nesters" from 2003 and "Why Don't Spiders Get Stuck in Their Webs?" from 2005.


Nature's Ways

Early Nesters

written by Clyde Sorrenson
illustrated by David Williams

For most of North Carolina's resident birds, January and February are the bleakest months. Gathering enough calories to make it through another bitterly cold night is each day's biggest challenge. But for great horned owls, the cold days of winter mean romance is in the air, while most birds are struggling to survive, the big owls are nesting.

The reason for their cold-season nuptials is the greater likelihood of finding enough food to raise the next generation. Great horned owls feed mostly on small mammals such as rabbits, rats and mice. These prey are largely nocturnal, so the owls hunt almost exclusively after dark. The long nights of winter provide more hunting time, and prey are more exposed as plant cover thins.

Nesting early also allows great horned owls to commandeer an old hawk, crow, heron or, sometimes, a squirrel nest for their own. But a head start on other nesters can have disadvantages: occasionally, the unintended eggs of careless owl parents freeze and die.

Finding a nest of great horned owls is unlikely (and getting near one a bit dangerous), but detecting them is easy on calm nights. Listen for the deep, five-hoot calls of the males and the seven-note calls of the females.

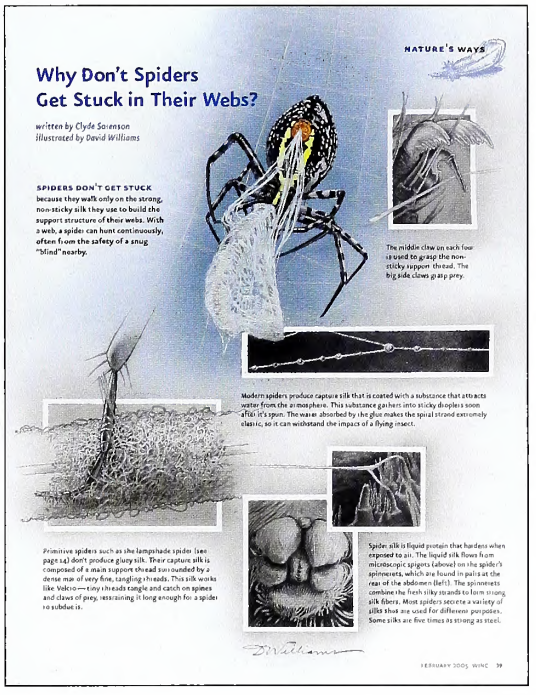
Revenue from sales of boxed sets of Nature's Ways will be donated to the Wildlife Endowment Fund. Visit www.ncwildlife.org and click on N.C. Wild Store.

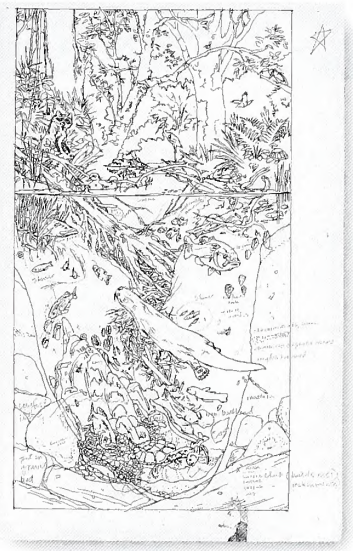
"So, exactly how is a hornet nest put together?" The voice on the other end of the phone line was big, deep, jovial and had an accent reminiscent of my southern Piedmont home. I had written my first "Nature's Ways," and the guy on the line, David Williams, was tasked with illustrating my words—the first of more than 30 such collaborations.

I soon learned that the most important word in Dave's request was "exactly." His first priority was always depicting nature as accurately as he possibly could. That he did so with beauty and grace as well is a testament to his tremendous talent. Over the last five years Dave and I became fast friends while we worked to ensure he had the resources he needed to "get it right." We also jaw-boned a lot about duck hunting, floating and fishing; turns out we had unknowingly hunted the same beaver swamps for the last 25 years.

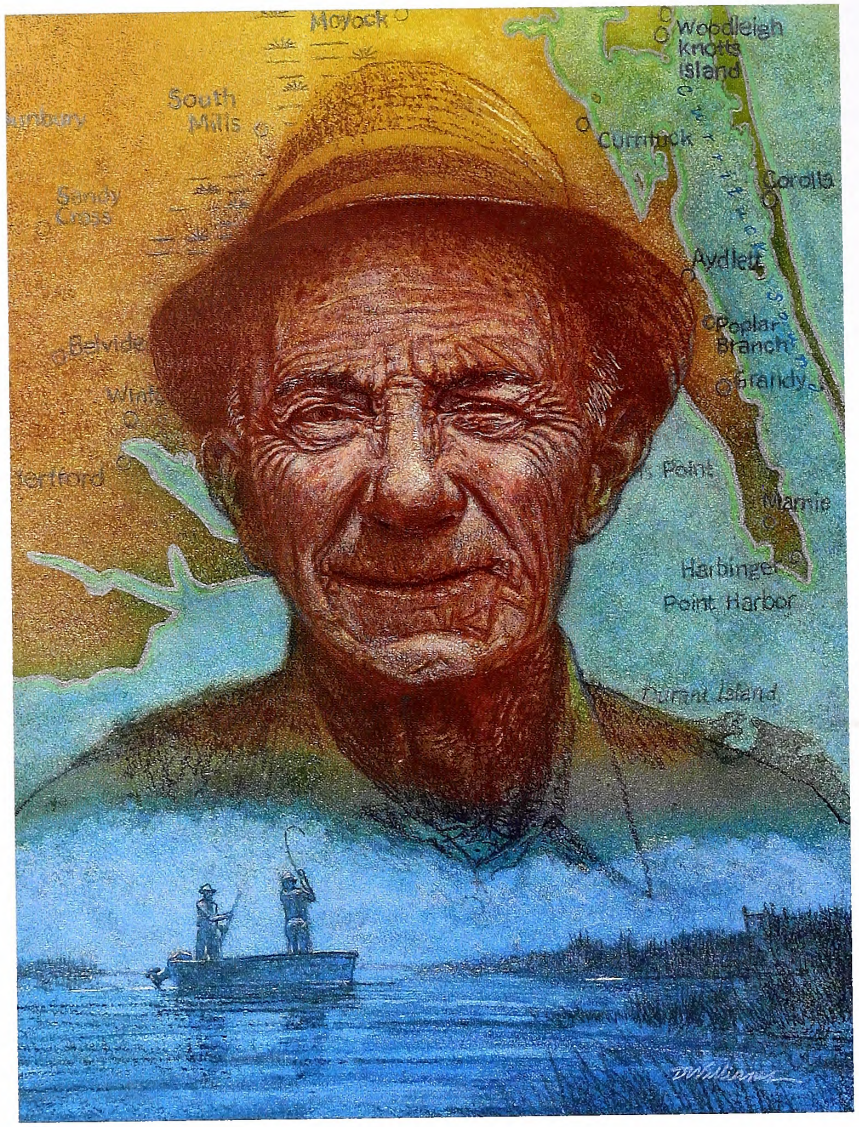
Dave also encouraged me in my modest artistic and photographic efforts, and he taught me to think about color as well as critters. Before I met Dave, I would have only seen the gull on the beach. Now I see, too, the pool of gold it stands in. Thanks, buddy.

– Clyde Sorenson





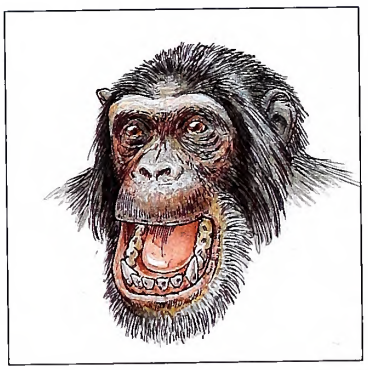
Left: Detail of panels Williams painted for display at the Centennial Campus Center for Wildlife Education, which is scheduled to open in the fall of 2006. Above: A working sketch for one of the 9-foot-by-5-foot panels.

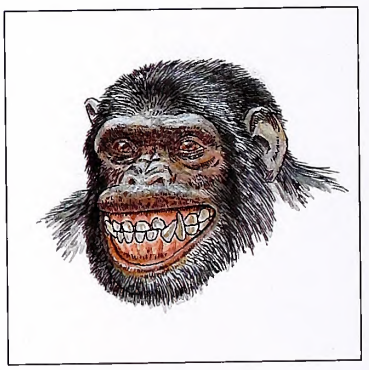


YOU, THE READERS AND FANS OF *Wildlife in North Carolina* magazine, are undoubtedly familiar with Dave's talents as an artist and illustrator. What you may not know or fully appreciate is how Dave so thoroughly studied his subject and how passionate he was to learn everything he could about the animals and the habitats he rendered. Whether hiking, canoeing, camping or hunting he took every opportunity to immerse himself within nature's living canvas.

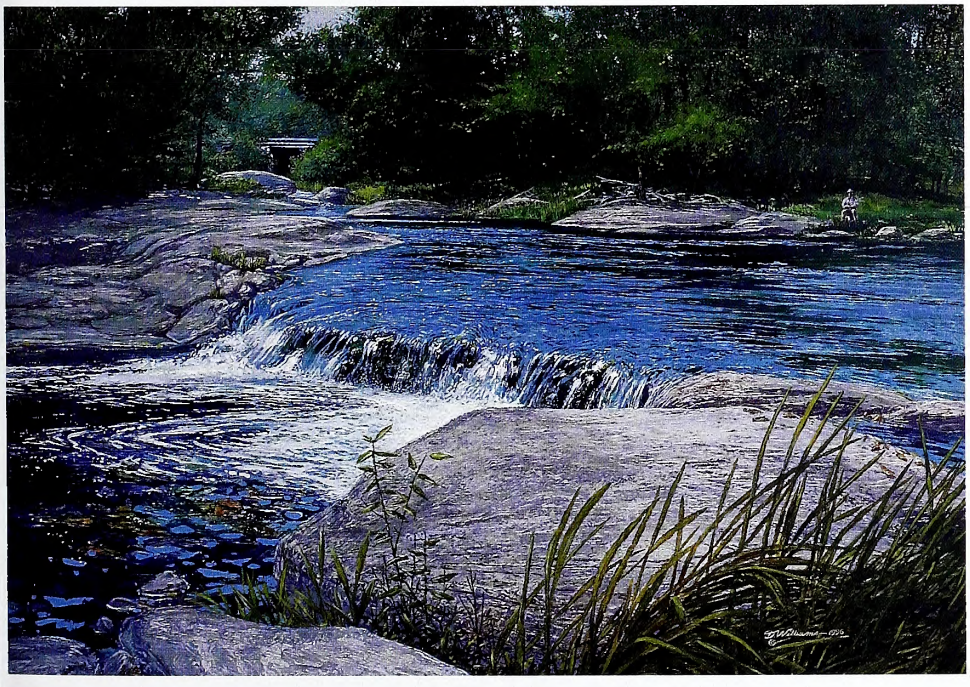
We, Dave's canoe buddies, affectionately called him Commander Dave, a title he earned on the first of 33 river/canoe camping trips we began some 15 years ago. Without effort or intention he became the father figure of our group and the teacher for the journey. As we paddled down the winding majestic waterways together he would always point out the hidden mysteries going on all around us: an otter run partially concealed by a leaning branch, a morphing insect tucked into the crevice of a rock, or the nesting site of the resident kingfisher. Indeed, our trips were never dull because Dave would always illuminate our minds with what was so obvious to his. Dave's elixir flowed from wildlife and the varied places where wildlife lives. Henceforth we shall sip nature's sweetness and appreciate its beauty while remembering our friend who drank it with gusto. ◆

–Matthew T. Smith



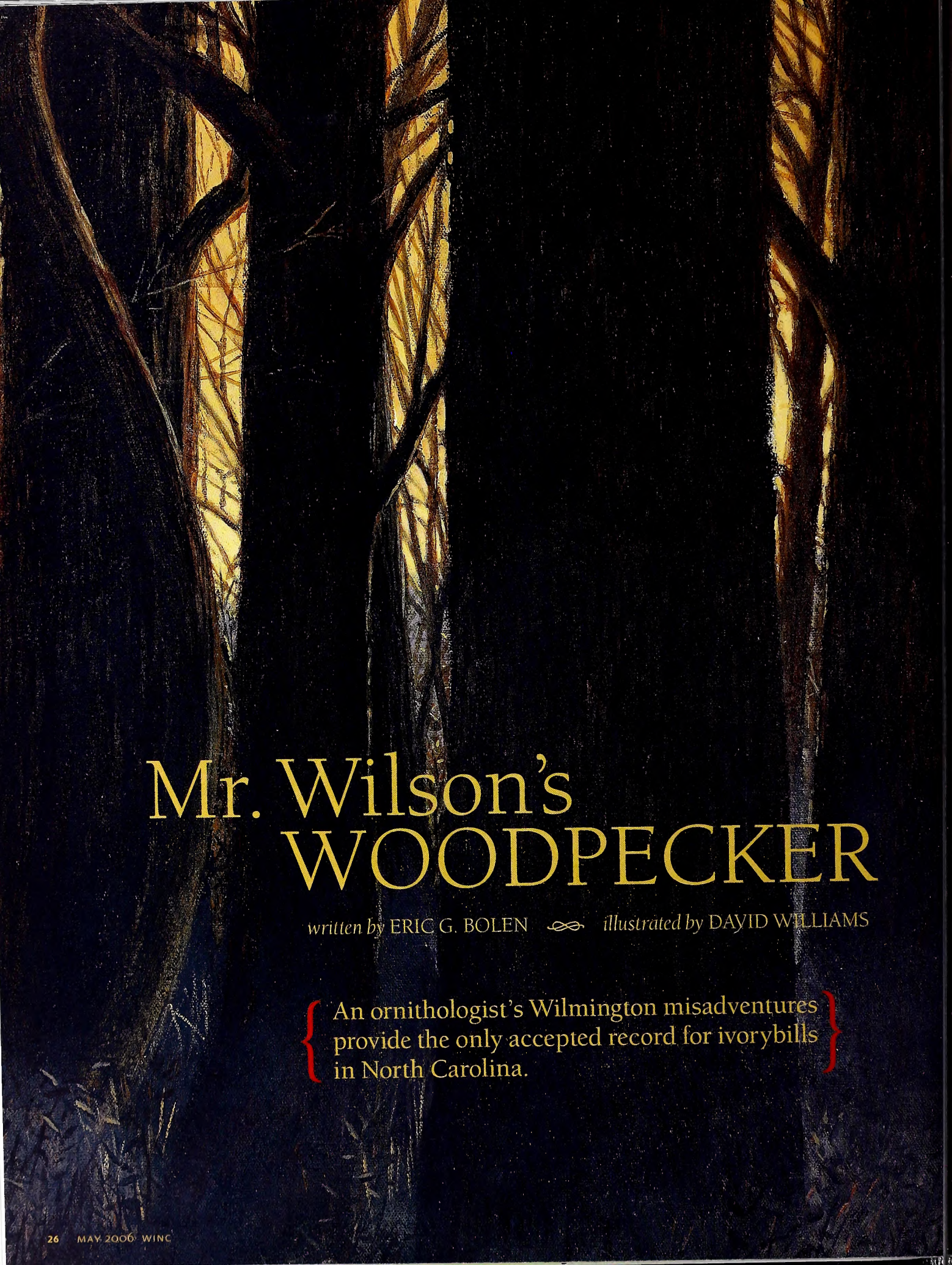


ARTWORK COURTESY OF MARY WILLIAMS



Opposite page: Currituck guide Wallace O'Neal was featured in a 1993 *WINC* story. These chimps were a few of those commissioned by the N.C. Zoo. This page: The canoeist above could be Williams himself. Falls of Neuse was one of his favorite places.

Jim Dean, Lawrence S. Earley and Duane Raver are all retired former editors of WINC. *T. Edward Nickens is an editor-at-large at* Field & Stream. *Clyde Sorenson is an associate professor at N.C. State University. All are frequent contributors to this magazine. Matthew T. Smith is an outdoorsman and a longtime friend of David.*



Mr. Wilson's WOODPECKER

written by ERIC G. BOLEN ∞ *illustrated by* DAVID WILLIAMS

{ An ornithologist's Wilmington misadventures provide the only accepted record for ivorybills in North Carolina. }

Alexander Wilson didn't fit the stereotype of a dour Scotsman, at least not upon his arrival in Wilmington. The year was 1809, and Wilson was on a twofold mission as he made his way on horseback through North Carolina en route to the Deep South. First, he was looking for new birds to illustrate, and second, he sought subscribers for his multivolume work "American Ornithology." His masterpiece of illustrations and accompanying text later would earn him distinction as the "father of American ornithology," but for the time being, the somewhat shabby painter was struggling to make ends meet.

Born in Scotland in 1766, Wilson immigrated to the United States in 1794. A peddler and minor poet in his native land, he produced writings that included "The Snark," which described a wealthy mill-owner's clever cheating of his employees. Angered by the revelations, the millowner began legal proceedings against Wilson, who wisely turned tail and departed for the distant shores of America.

After arriving in Pennsylvania, Wilson soon fell under the influence of two prominent souls of the day—Charles Willson Peale, portraitist and collector of fossils and other natural curiosities, and William Bartram, accomplished botanist and traveler. In their company the seed was planted that later blossomed into Wilson's portfolio of American birds. The road to Wilmington awaited.

Wilson—and later the famed John James Audubon—had few scruples about shooting birds. Birdshot and black powder were as much a part of a painter-naturalist's equipment in the early 19th century as were brushes and palette. No cameras were available to freeze the images of birds, so a shotgun deftly aimed at an unsuspecting target secured the feathered models. Once felled, the birds were draped in more or less lifelike poses, although the posture of some subjects often resulted in a mien more of rigor mortis than of animation.

Traveling alone, Wilson approached Wilmington via New Bern along a route that generally followed the path of present-day U.S. 17. The rutted roadway traversed expanses of sand flats studded with groves of pine, frequently punctuated with dark creeks and forbidding swamps. According to George Washington, who had traveled the same stretch of road in much grander style some years earlier, "The whole road [to Wilmington] passes through the most barren country I ever beheld." Ever the planter, Washington was quick to assess landscapes in terms of their potential for farming. But to Wilson the cypress swamps in the region offered a special kind of treasure: more birds to paint, including species never before formally described. "Here," he wrote, "I found multitudes of birds that never winter with us in Pennsylvania, living in abundance."

In his words, "This majestic and formidable species in strength and magnitude stands at the head of the whole class of woodpeckers hitherto discovered. He may be called the king or chief of his tribe."

Indeed, about 12 miles north of Wilmington at a place today known as Scotts Hill, Wilson encountered one of North America's most impressive birds. In his words, "This majestic and formidable species in strength and magnitude stands at the head of the whole class of woodpeckers hitherto discovered. He may be called the king or chief of his tribe." Wilson had chanced upon the ivory-billed woodpecker.

Indians once fashioned necklaces and ornate wreaths from the birds' striking white bills, and tribes living in the North traded as many as three buckskins with their southern counterparts for a single bill from a hapless victim. Nonetheless, it was the wholesale destruction of nesting and foraging habitat that eventually tipped the balance against ivorybills. In Wilson's time, however, most of the mature swamp forests in North Carolina were still pristine, and he easily shot three of the birds from the tall trees near the roadway. Two of the birds were killed outright, but the third was only slightly wounded on one wing. It became the young painter's traveling companion as he proceeded to Wilmington.

And here's where Wilson had some fun. The wounded bird, as might be expected, was less than sanguine about its current circumstances. More to the point, it was still healthy enough to utter what Wilson described as a "loudly reiterated and most piteous note, exactly resembling the violent crying of a young child." The clamor terrified Wilson's horse, but the painter nonetheless carried the noisy woodpecker undercover at his side as he rode into Wilmington.

The bird's screeches quickly attracted the attention of anyone within hearing distance, particularly the women of the town, who hurried to their doors and windows "with looks of alarm and anxiety." When Wilson arrived at the hotel, the innkeeper — one William Dick — came forward, joined by several rather distressed onlookers.

Wilson then set the hook he had carefully baited as he rode through the streets of the city. Would there be suitable accommodations available, he asked loudly, for himself and "my baby," whose ample squalling from under the cover continued to accommodate the ruse.

Wilson, savoring the moment, stretched the crowd's apprehensions for a minute or two more, then he uncovered the woodpecker for all to see. "A general laugh took place," mostly at the expense of the indignant Mr. Dick. We have no record, of course, about the response of the ivorybill, which by this time no doubt wished to be a-wing again in the nearest cypress swamp. But there was more to come, and Dick, hotel keeper and would-be protector of small children, was again to bear the burden of Wilmington's encounter with Mr. Wilson and his woodpecker.

Once in his hotel room, Wilson left the bird unattended while he sought care for his horse, which had been terrified by the wailing bird. Here let me pause to interject some basic ornithology: The working end of an ivory-billed woodpecker resembles a railroad spike, and at full throttle, it moves like a berserk jackhammer. Given the rapidity and impact of their hammering, these industrious birds must have brains as delicate as ball bearings (see Nature's Ways, page 39). Moreover, few surfaces except the side of a Brink's truck could likely withstand an all-out attack by even a mild-mannered ivorybill. Serious stuff, especially since this ivorybill was not a happy camper. Havoc thus awaited Wilson on his return about an hour later. His disgruntled pet, although a semi-invalid, had hammered a fist-sized hole in the wall, exposing the lathing clear through to the weatherboards. In the process, the demolition bird had covered the bed with a snowdrift of chipped plaster. In another hour, according to Wilson, the bird would have chiseled its way to freedom in downtown

Wilmington, hardly a suitable convalescent area for a wing-shot woodpecker.

Undaunted by the experience and still needing the bird for a painting, Wilson tethered the ivorybill to a table in his battered hotel room. The dutiful Scot then left again, this time in search of food for his destructive woodpecker, which surely must have been engulfed with hunger by this time. However, we lack any notion as to just what sort of food Wilson sought for the bird, wood-dwelling insect larvae being especially scarce in Wilmington's markets.

When Wilson approached his room for the second time, he heard the ivorybill hard at work once more. But instead of a damaged wall, the bewildered painter found splintered furniture. In his words, Wilson "had the mortification to perceive that [the woodpecker] had almost entirely ruined the mahogany table to which he was fastened, and on which he had wreaked his whole vengeance."

{ In his words, Wilson "had the mortification to perceive that [the woodpecker] had almost entirely ruined the mahogany table to which he was fastened, and on which he had wreaked his whole vengeance."

History does not favor us with Dick's response to these events, but he may have thought of making some Indian jewelry on the spot: the first "bead" for a necklace was right there, its owner perched in the litter that was once a hotel room. Yet Dick, twice the victim of Wilson's woodpecker, bought a subscription to Wilson's great work on American birds. Perhaps, as suggested by historians Marcus Simpson and Stephen MacAllister, Wilson offered the much-suffering landlord a significant discount as payment for the damage.

And what of the wounded ivorybill? It died a few days later, having rejected whatever food Wilson had procured for it. We have only silence about the continued lodging for either bird or artist in Wilmington. Even so, the bird lives on, immortalized in a color plate in "American Ornithology." As a further memorial, Wilson's ivory-billed woodpecker established two noteworthy scientific records. First, it stands as the only accepted record of the species in North Carolina, and second, the location at Scotts Hill is the northernmost in the known range of ivorybills on the East Coast. Surely that's enough of an epitaph for any bird. William Dick likely thought so. ◆

Eric G. Bolen is a professor emeritus of biology at UNC Wilmington.

SEARCH FOR 'LORD GOD BIRD' WILL EXAMINE OTHER LOCATIONS

ILLUSTRATIONS FROM "AMERICAN ORNITHOLOGY," SPECIAL COLLECTIONS, UNIVERSITY OF VIRGINIA LIBRARY

The announcement in April 2005 that sightings of an ivory-billed woodpecker had been verified by ornithologists jolted conservation agencies into action. The remarkable rediscovery of a bird long considered extinct occurred in the 62,000-acre Cache River National Wildlife Refuge in Arkansas, hence protection of the species and its critical habitat already fall under federal jurisdiction. The U.S. Fish and Wildlife Service, in addition to fulfilling the mandate of the Endangered Species Act, operates the refuge and thus remains the primary agency responsible for managing the relict population of "Lord God birds." The refuge remains open to visitors, and five sites within a 5,000-acre access area have been set aside expressly for those hoping to glimpse an ivorybill. Law enforcement surveillance has been increased.

Last July, former Secretary of the Interior Gale Norton and Secretary of Agriculture Mike Johanns announced that a multi-year partnership to protect the bird would be forthcoming; they proposed that $10.2 million be committed to the effort. The federal funds supplement some $10 million already pledged from private sources.

In keeping with the provisions of the Endangered Species Act, Norton also appointed a recovery team whose goal is to complete a comprehensive management plan by the summer of 2007. The team is divided into working groups: The first is concerned with habitat management and conservation, and a second deals with the birds' biology (e.g., at what stage in the decay of a tree is desirable insect larvae most abundant as food?). One of the first tasks of the recovery team is to pinpoint sites elsewhere in the ivorybill's historic range in the southern United States where the rare birds might still persist. Rumors suggest a few ivorybills may persist in inaccessible areas in South Carolina, Louisiana, Florida and Texas. A small population of a subspecies of the bird might still linger in Cuba. But whereas ivorybills likely inhabited the Waccamaw watershed in North Carolina in bygone years, the bottomland woods remaining there no longer appear to offer suitable habitat

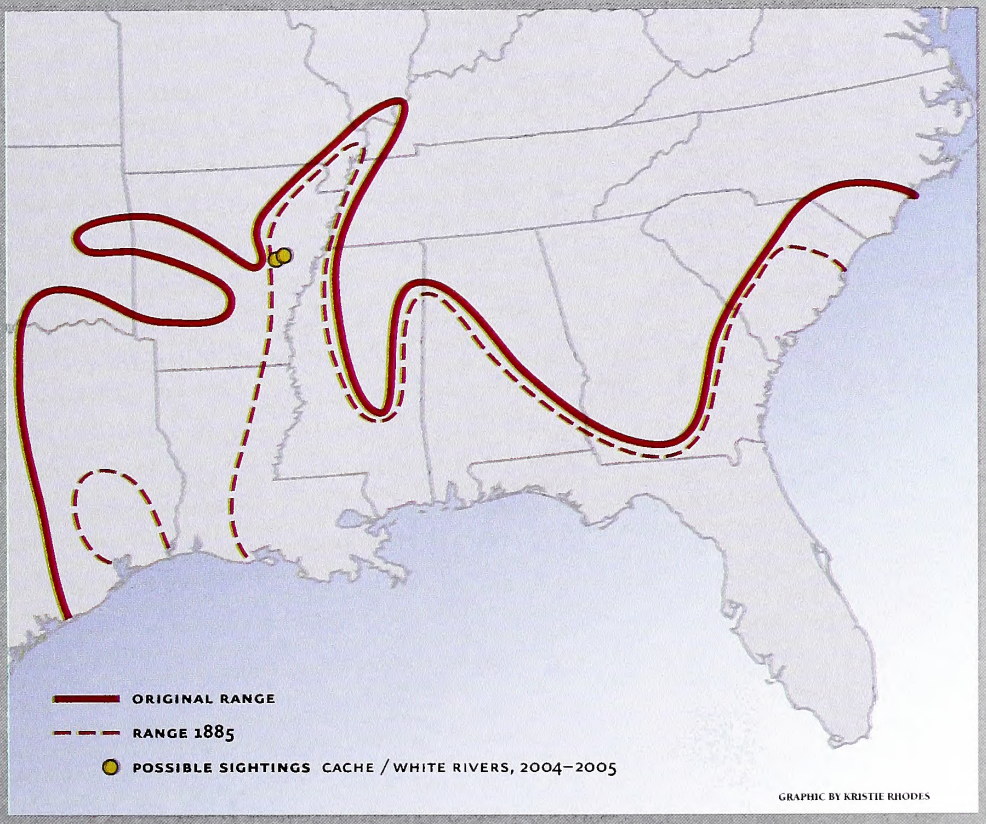
Also nested into the recovery team is a third working group whose mission concerns the Corridor of Hope, the designation for an effort to protect key habitat in a 120-mile-long tract of bottomland hardwood forest known as the Big Woods of Arkansas. (The corridor includes the Cache River refuge, which shelters seven other endangered species, as well as another federal wildlife refuge.) Still other parts of the vital area were purchased by The Nature Conservancy. Yet, because other parts of the Big Woods are in private ownership, the group's primary focus is to work with landowners toward a common goal; that is, to reduce fears of unwanted government intrusion while providing ivorybills with critical habitat.

In other action, the National Wildlife Federation and its Arkansas affiliate recently filed a suit to halt construction on an irrigation project designed to siphon 1.58 billion gallons of water for agricultural use, which would have drained the watershed where the ivorybill was first sighted.

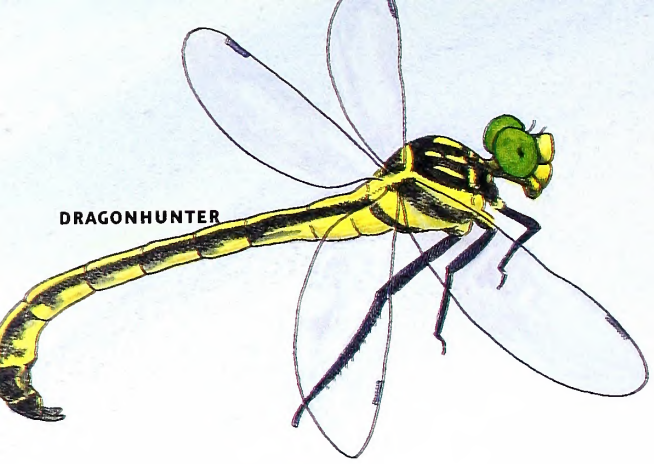
The ivorybill is a candle that still flickers, however slightly, in the chilling breeze of extinction, but the flame is fueled by hope that seemed extinguished for more than 60 years. We are blessed with a second chance.

– Eric G. Bolen

IVORYBILL RANGE MAP



GRAPHIC BY KRISTIE RHODES

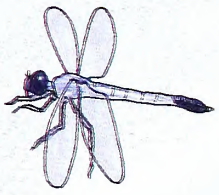


DRAGONHUNTER

Today I saw the dragon-fly
Come from the well where he did lie.
An inner impulse rent the veil
Of his old husk; from head to tail.
He dried his wings; like gauze they grew;
Through crofts and pastures wet with dew
A living flash of light he flew.

–Alfred Lord Tennyson, "The Two Voices"

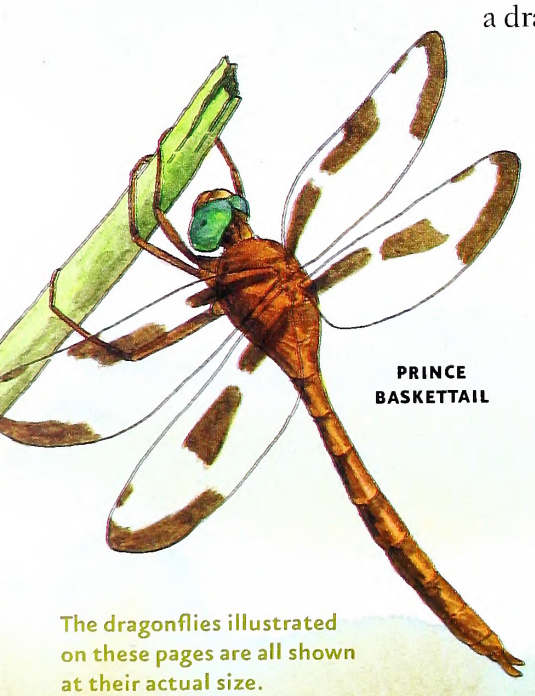
Fly, Dragonflies!



LITTLE BLUE DRAGONLET

written by Buffy Silverman / illustrated by Consie Powell / nature activity by Anne M. Runyon

On a summer day, dozens of dragonflies dart across a pond. One hovers like a helicopter, and then snatches a mosquito from the air. Another splashes down to the water and drinks. But in winter there's not a dragonfly in sight. Where do these summer insects come from?



PRINCE BASKETTAIL

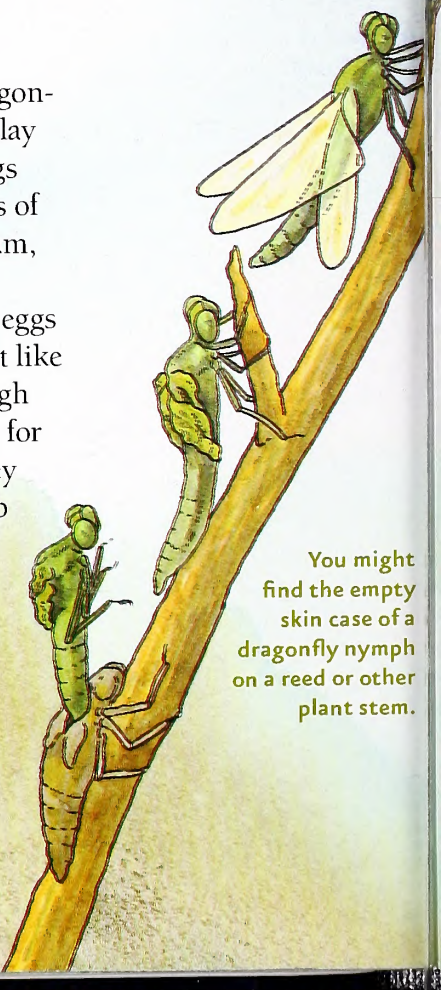
The dragonflies illustrated on these pages are all shown at their actual size.

UNDERWATER BEGINNINGS

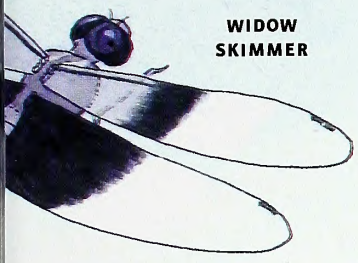
In the summer, dragonflies mate. Then a female dragonfly lays her eggs. Some dragonflies pierce the stems of pond plants and lay their eggs inside. But most drop their eggs one by one in the water. They dip the tips of their abdomens into a lake, pond or stream, and the eggs sink to the bottom.

The dragonflies that hatch from these eggs are called nymphs. They don't look or act like adult dragonflies. Instead of flying through the air, they crawl underwater, searching for food. If they spot something moving, they shoot their hinged jaws forward and grab a meal. With the pincers on the end of the jaw, they grab mosquito larvae and other small water bugs.

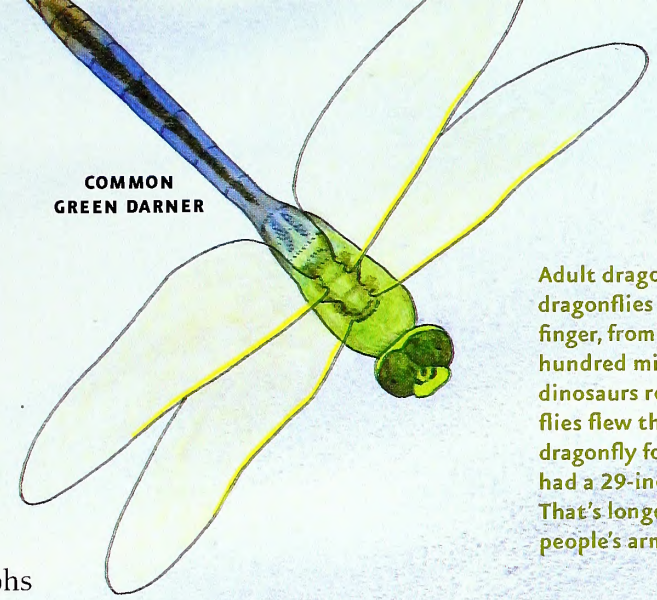
AQUATIC NYMPHS



You might find the empty skin case of a dragonfly nymph on a reed or other plant stem.



WIDOW SKIMMER



COMMON GREEN DARNER

Adult dragonflies do not grow. Most dragonflies are about the size of a person's finger, from 1 to 3 inches long. Three hundred million years ago, before the dinosaurs roamed the earth, giant dragonflies flew through the sky. A fossil dragonfly found in Germany had a 29-inch wingspan. That's longer than most people's arms.

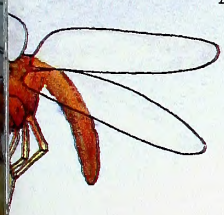
GROWING AND HUNTING

All year, dragonfly nymphs crawl underwater. As the nymphs grow, they hunt larger prey. If tadpoles or small fish swim by, dragonfly nymphs try to snare them and chew them up.

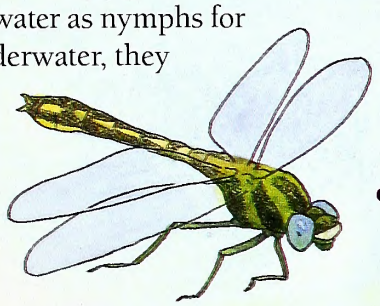
Although dragonfly nymphs are fierce predators, they must hide from animals that hunt them. Fish, birds, aquatic insects and even other dragonfly nymphs prey upon them. When enemies approach, a nymph pulls water in through its tail and then shoots it back out. It rockets away and then hides in the muddy bottom until the predator is gone.

As a dragonfly nymph grows, it gets too big for its hard outer skin. The skin splits and the nymph crawls out. Most dragonflies live underwater as nymphs for 1 to 3 years. While underwater, they shed their skins many times.

TWELVE-SPOTTED SKIMMER



YELLOW-LEGGED MEADOWHAWK



LANCET CLUBTAIL

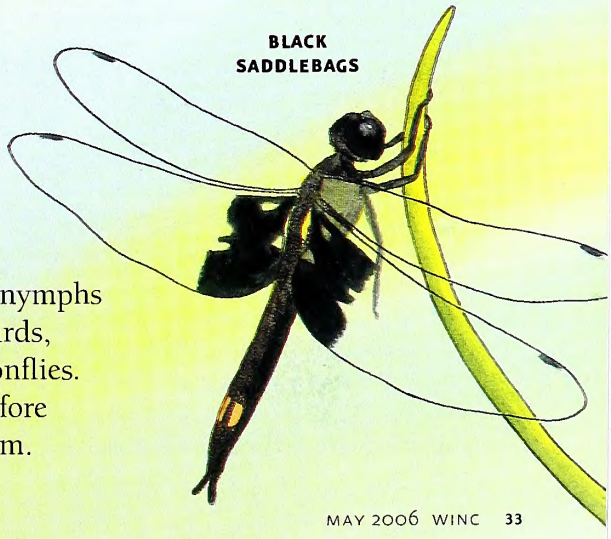
EASTERN AMBERWING

BECOMING AN ADULT

When a dragonfly is fully grown, it changes from an underwater nymph to a flying adult. The nymph crawls out of the water and climbs up and up. On land, it clings to a plant stem, tree trunk or dock. There it rests.

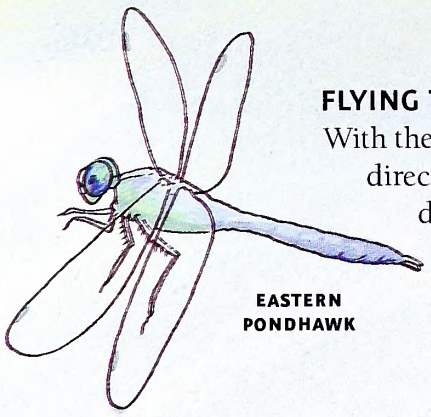
Soon the skin on the nymph's back splits open. The dragonfly wriggles and wriggles, pulling its body out. Its wrinkled, wet wings hang down. Gripping onto its shed skin with its new legs, the dragonfly yanks itself free. For about an hour the dragonfly's wings harden. The dragonfly holds them out and they hum like a fan. Then it flies away, leaving the shed skin behind.

While dragonflies are changing from nymphs to adults, they cannot escape predators. Birds, spiders and ants prowl for helpless dragonflies. Many dragonflies change into adults before sunrise, when predators cannot see them.



BLACK SADDLEBAGS

HALLOWEEN PENNANT



EASTERN PONDHAWK

COMMON SANDDRAGON

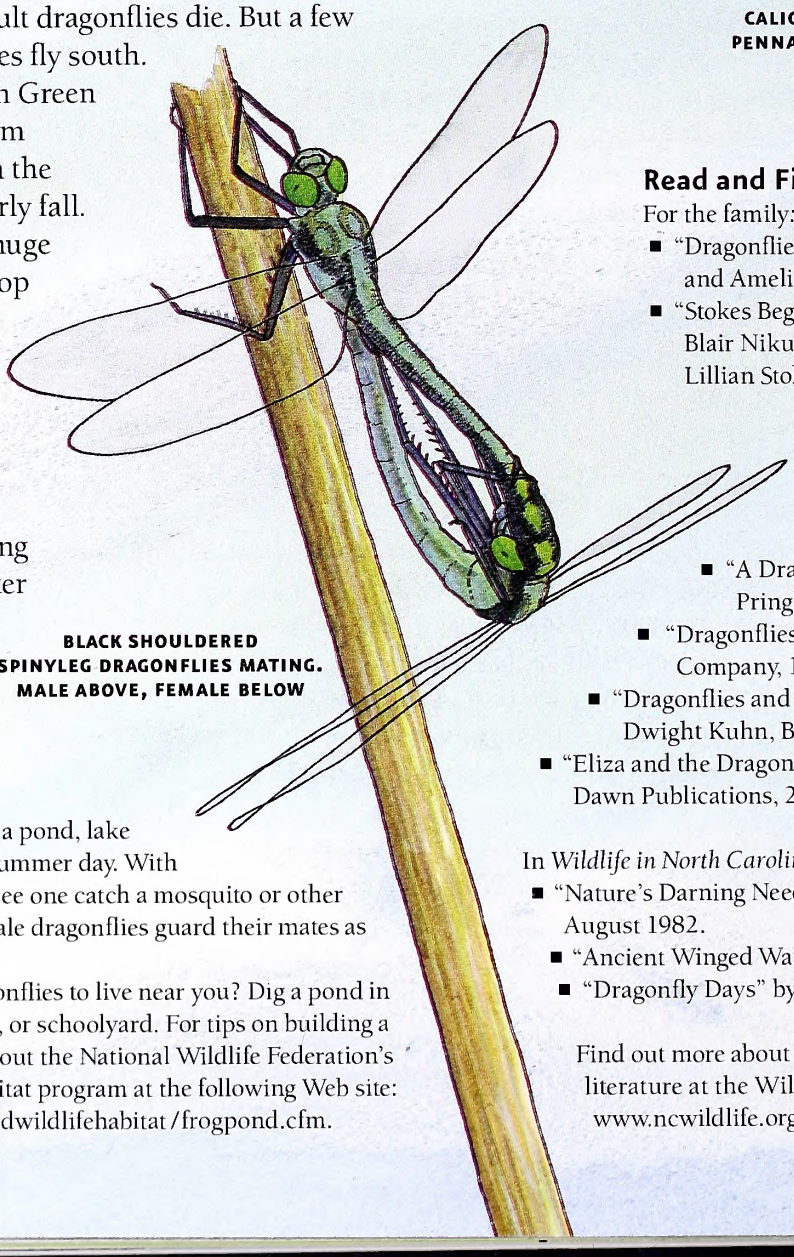
FLYING THROUGH THE SKY

With their two large eyes, dragonflies can see in every direction. They find moths, mosquitoes, smaller dragonflies and hornets to eat. Zipping through the air, they catch small insects in their mouths. Dragonflies use their long legs to grab larger prey, and then crunch and grind them with their jaws.

Male dragonflies search for good places for mating and laying eggs. A male chases other males away, trying to defend the best spot. When a female nears, the pair mates. Males often hold on to the female or hover over her while she lays her eggs. The male attacks and chases away other males that try to mate with her.

After dragonflies mate and lay eggs and the weather turns cool, most adult dragonflies die. But a few species of dragonflies fly south. Swarms of Common Green Darners migrate from northern habitats in the late summer and early fall. During migration, huge numbers of them stop at North Carolina lakes and ponds. When they reach their winter homes, they lay their eggs and then die. In the spring, their offspring crawl out of the water and fly north.

CALICO PENNANT



BLACK SHOULDERED SPINYLEG DRAGONFLIES MATING. MALE ABOVE, FEMALE BELOW

Get Outside

Look for dragonflies at a pond, lake or stream on a sunny summer day. With binoculars you might see one catch a mosquito or other flying insect. Watch male dragonflies guard their mates as they lay eggs.

Want to invite dragonflies to live near you? Dig a pond in your backyard, garden, or schoolyard. For tips on building a backyard pond, check out the National Wildlife Federation's Backyard Wildlife Habitat program at the following Web site: www.nwf.org/backyardwildlifehabitat/frogpond.cfm.

Read and Find Out

For the family:

- "Dragonflies (Wild Guide)" by Cynthia Berger and Amelia Hansen, Stackpole Books, 2004.
- "Stokes Beginner's Guide to Dragonflies" by Blair Nikula, Jackie Sones, and Donald and Lillian Stokes, Little, Brown, 2002.

For young readers:

- "Dancing Dragons: Dragonflies in Your Backyard" by Nancy Loewen, Picture Window Books, 2005.
- "A Dragon in the Sky" by Laurence Pringle, Scholastic, 2001.
- "Dragonflies" by Molly McLaughlin, Walker & Company, 1989.
- "Dragonflies and Damselflies" by Elaine Pascoe and Dwight Kuhn, Blackbirch Press, 2005.
- "Eliza and the Dragonfly" by Susie Caldwell Rinehart, Dawn Publications, 2004.

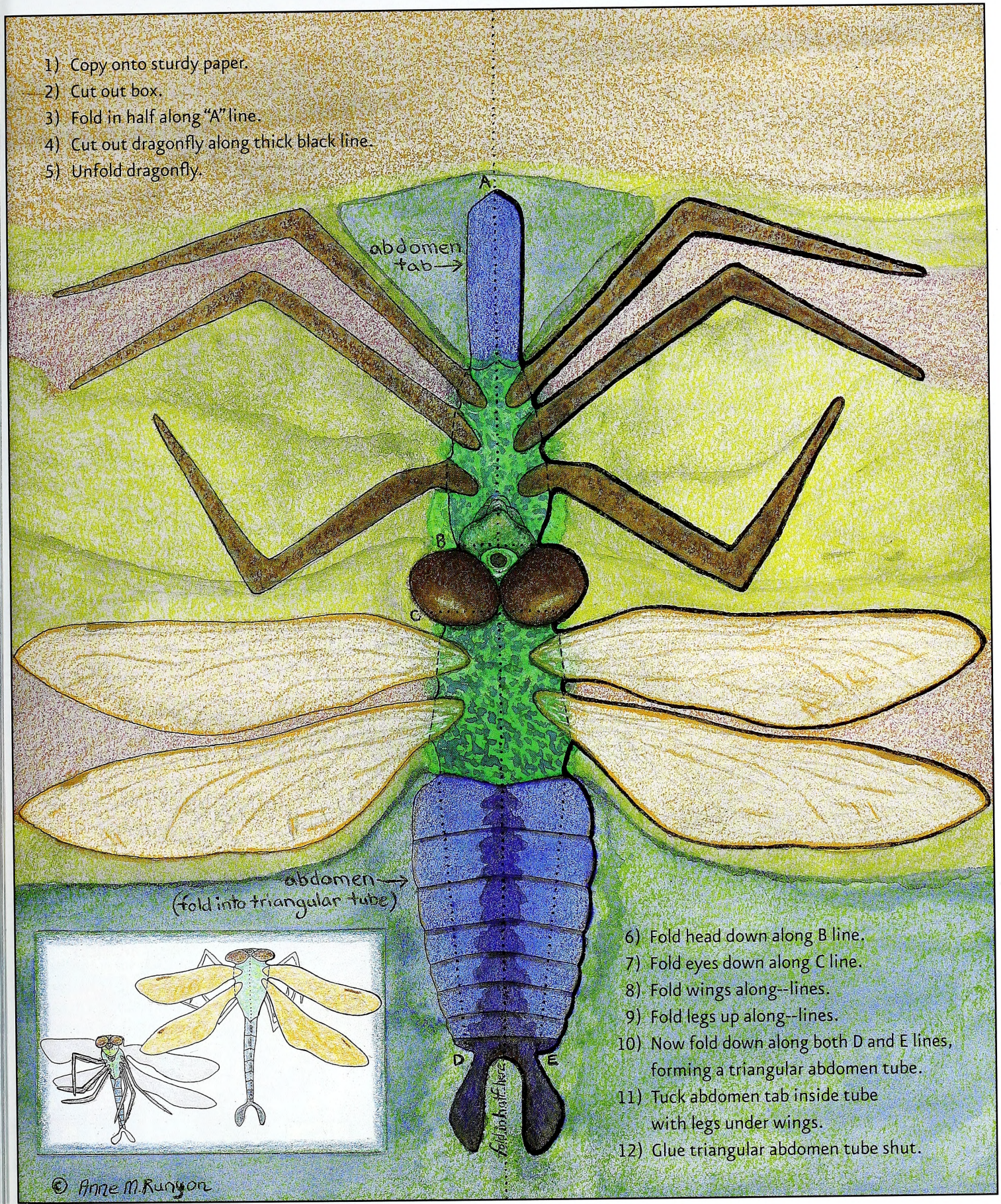
In *Wildlife in North Carolina:*

- "Nature's Darning Needles" by Lawrence S. Earley, August 1982.
- "Ancient Winged Warriors" by David S. Lee, July 1989.
- "Dragonfly Days" by David S. Lee, July 1989.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site, www.ncwildlife.org.

Make your own soaring dragonfly sculpture!

1) Copy onto sturdy paper.
2) Cut out box.
3) Fold in half along "A" line.
4) Cut out dragonfly along thick black line.
5) Unfold dragonfly.



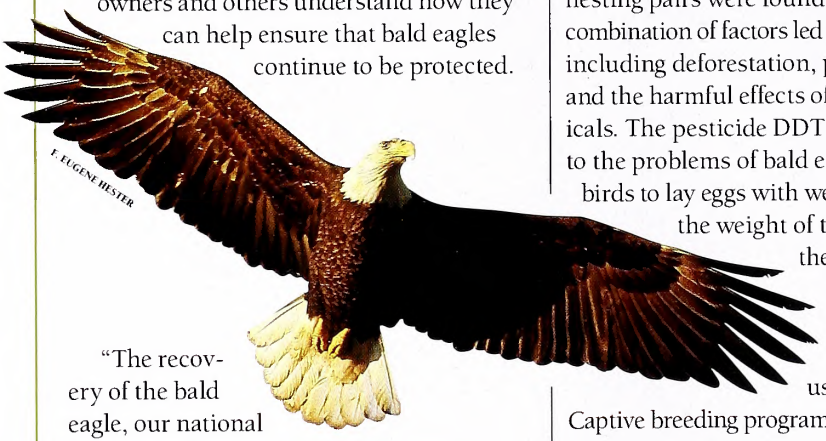
6) Fold head down along B line.
7) Fold eyes down along C line.
8) Fold wings along--lines.
9) Fold legs up along--lines.
10) Now fold down along both D and E lines, forming a triangular abdomen tube.
11) Tuck abdomen tab inside tube with legs under wings.
12) Glue triangular abdomen tube shut.

© Anne M. Runyon

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Bald Eagles Could Leave Endangered List

The bald eagle, once on the verge of extinction, is another step closer to being removed from the endangered species list. The U.S. Fish and Wildlife Service has proposed voluntary guidelines and a regulatory definition designed to help landowners and others understand how they can help ensure that bald eagles continue to be protected.


T. EUGENE HESTER

"The recovery of the bald eagle, our national symbol, is also a great national success story," said H. Dale Hall, director of the U.S. Fish and Wildlife Service. "Should the eagle be delisted, we expect that the public will notice little change in how eagles are managed and protected."

Hall said that when they are delisted from the Endangered Species Act, bald eagles will continue to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Both acts protect bald eagles by prohibiting killing, selling or otherwise harming eagles, their nests or eggs.

The bald eagle once ranged throughout every state except Hawaii. By 1963, only 417 nesting pairs were found in the lower 48. A combination of factors led to the birds' decline, including deforestation, poor water quality and the harmful effects of agricultural chemicals. The pesticide DDT contributed greatly to the problems of bald eagles, causing the birds to lay eggs with weak shells. Under the weight of the nesting eagle, the eggs would break.

The Environmental Protection Agency banned the use of DDT in 1972. Captive breeding programs, reintroduction, law enforcement efforts, protection of habitat around nest sites during the breeding season and land purchase and preservation helped bald eagle populations rebound.

The success of these efforts resulted in the recovery of the species to the point that in 1995 its listing status was changed from endangered to threatened in most states in the continental U.S.—with the exception of Michigan, Minnesota, Oregon, Washington and Wisconsin, where it was always designated as threatened. The species was never listed as threatened or endangered in Alaska.

The N.C. Wildlife Resources Commission began the N.C. Bald Eagle Project in 1982 to help restore the bird to our state. Eagles were raised in captivity and then reintroduced into the wild. Commission biologists released 29 juvenile bald eagles at Lake Mattamuskeet from 1983 through 1988. The state's first post-DDT wild bald eagle nest was documented in 1984 near Mattamuskeet. The commission continues to monitor approximately 80 eagle nesting territories.

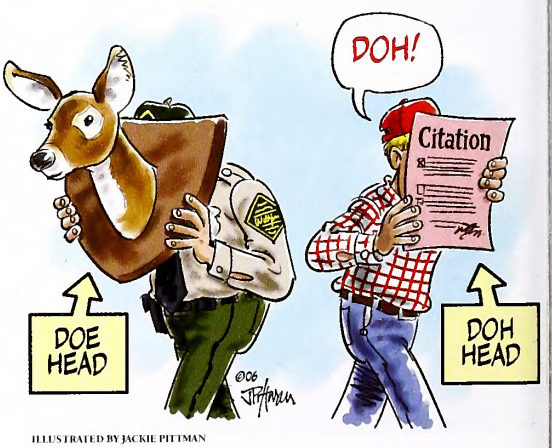
Since delisting was first proposed in 1999, recovery of the bald eagle has continued to progress. Today there are an estimated 7,066 nesting pairs in the U.S.

If the bald eagle is delisted, Fish and Wildlife will work with state wildlife agencies to monitor the status of the species for a minimum of five years, as required by the Endangered Species Act. A draft monitoring plan is expected to be released for public comment should the species be delisted. If at any time it becomes evident that the bald eagle again needs the act's protection, the service will propose to relist the species.

ON PATROL

District Eight Officer Chad Arnold was reading through the *Shelby Shopper* when he saw an ad placed by a man who wanted to sell two mounted deer heads, one of a doe, the other of a buck. Arnold called the subject and asked about the heads. The man said he had sold the buck head, but still had the doe. The officer went to his house in uniform, thinking the man had figured out by now it was illegal, and asked for the mount. The man brought it to him and asked, "Will you give me $30 for it?"

Arnold advised the man it was illegal to sell the mount in North Carolina, and the man said, "I know, but who is going to tell?" After the man dropped the price to $25, Arnold advised him again that selling the mount was not legal and that he was going to issue him a citation. At this point the man looked at the patch on Arnold's shoulder, and asked, "Are you the game warden?" Arnold's answer was affirmative.



ILLUSTRATED BY JACKIE PITTMAN

CALENDAR OF EVENTS

Thursday–Sunday, May 4–7

Learn about the wildlife of the Outer Banks in the second annual Spring Wings Over Water in Rodanthe. Activities include birding, paddling and natural history programs. Contact (252) 441-8144 or visit www.wingsoverwater.org.

Wednesday–Saturday, May 10–13

Fish for billfish, tuna, dolphin and wahoo in the 12th annual Hatteras Village Offshore Open. Visit www.hatterasoffshoreopen.com.

Saturday, May 13

- Explore deer management at the white-tailed deer management workshop at Howell Woods Educational Learning Center, sponsored by the Cape Fear River Branch of the Quality Deer Management Association. Sessions run from 9 a.m. to 4 p.m. Speakers include Joe Folta of the N.C. Wildlife Resources Commission, Chris Moorman of N.C. State University and James Sasser of Howell Woods. Visit www.capefear-qdma.org or call (919) 552-9449.

- Celebrate Migratory Bird Day at the N.C. Zoo in Asheboro with bird-watching, games and other activities. Visit www.nczoo.org.

Friday–Sunday, May 26–28

Explore the paleontology of the Coastal Plain at the 13th annual Aurora Fossil Festival. Fund-raising auction is Saturday. Contact (252) 322-4238 or visit www.aurorafossilmuseum.com.

Saturday–Sunday, May 27–28

Go nuts at the third annual White Squirrel Festival in Brevard. Activities include a street festival and walking tours of the Brevard College campus to watch white squirrels. Visit www.brevardnc.org or call (828) 884-3278.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Commission Increases DU Contribution

Waterfowl will get a bigger financial boost from North Carolina this year. The N.C. Wildlife Resources Commission will increase its annual contribution to Ducks Unlimited (DU) in support of wetland and waterfowl conservation in the Maritime Provinces of eastern Canada from $30,000 to $50,000, a 250 percent increase from 2004. In 2005, the commission doubled its annual contribution from $15,000 to $30,000.

NCWRC

These funds will be matched at least four-fold by DU, Ducks Unlimited Canada and the U.S. Fish and Wildlife Service through the North American Wetlands Conservation Act to support the Agricultural Wetland Restoration Program (AWRP) in eastern Canada. The goal of this partnership is to protect, enhance, and restore important breeding and staging habitat in New Brunswick, Nova Scotia and Prince Edward Island.

This area is intensively farmed, and wetlands and riparian areas threatened by agricultural and urban expansion need to be protected. The AWRP aims to work with farmers, and encourages them to use farming practices that conserve wetlands, promote biodiversity, improve soil and water quality and protect riparian areas. Other habitat improvement activities conducted through the AWRP include maintenance of beaver ponds, and monitoring productivity of existing wetland projects.

"Many of the waterfowl that winter in or migrate through North Carolina originate in the Maritime Provinces of Canada, and to maintain populations, we need to provide habitat that supports their entire life-cycle needs," said Ross Melinchuk, director of public policy for DU's Southern Region office. "Wetland and associated upland enhancement in this part of Canada will benefit black ducks, mallards, green-winged teal, ring-necked ducks, wood ducks and Canada geese."

"It is critical that the commission do its part to conserve waterfowl for future generations, whether it's on the wintering grounds in North Carolina or the breeding grounds in Canada," said John Pechmann, chairman of the Wildlife Commission.

The commission has supported wetland and waterfowl habitat protection in Canada since 1969. Over the past 37 years, the agency has contributed more than $370,000 toward Canadian projects in Manitoba, Nova Scotia, New Brunswick and Prince Edward Island.

The partnership with DU falls under the umbrella of the Sound CARE (Conservation of Agriculture, Resources and the Environment) conservation initiative. Through this initiative, DU has created partnerships to help restore, enhance and protect wetland habitat that benefits waterfowl, other wildlife and people in North Carolina. Sound CARE's goal is to protect and restore 64,000 acres in North Carolina and on the breeding grounds over the next five years. This work will cost $22 million. The United States has lost more than half of its original wetlands and continues to lose more than 100,000 wetland acres each year.

Wildlife Endowment Fund Report

Fund Balance $58,982,643.82

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to Wildlife in North Carolina magazine, as well as tax-deductible contributions. Although the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future. See www.ncwildlife.org for information.

Four New Nontoxic Shot Types Approved

The U.S. Fish and Wildlife Service recently approved four new nontoxic shot types for waterfowl and coot hunting in the United States. Waterfowl can ingest expended lead shot and die from lead poisoning. Efforts to phase out lead shot began in the 1970s, and a nationwide ban on lead shot for all waterfowl hunting was implemented in 1991. Canada followed with a complete ban in 1999.

The approved shot types are:

- A formulation of tungsten-iron-copper-nickel (TICN) shot, composed of 40 to 76 percent tungsten, 10 to 37 percent iron, 9 to 16 percent copper and 5 to 7 percent nickel produced by Spherical Precision, Inc. of Tustin, Calif.;
- A formulation of iron-tungsten-nickel (ITN) alloys composed of 20 to 70 percent tungsten, 10 to 40 percent nickel, and 10 to 70 percent iron produced by ENVIRON-Metal Inc. of Sweet Home, Ore.;
- A formulation of tungsten-bronze (TB) shot made of 60 percent tungsten, 35.1 percent copper, 3.9 percent tin, and 1 percent iron produced by Olin Corporation of East Alton, Ill.; and
- A formulation of tungsten-tin-iron (TTI) shot composed of 58 percent tungsten, 38 percent tin, and 4 percent iron produced by Nice Shot, Inc., of Albion, Penn.

A study in the mid-1990s suggested that the nationwide ban in the United States on the use of lead shot for waterfowl hunting has had remarkable success. Six years after the ban, researchers estimated a 64 percent reduction in lead poisoning deaths of surveyed mallard ducks and a 78 percent decline in lead pellet ingestion. The study concluded the restrictions on lead shot have prevented the deaths of thousands of waterfowl.

With the approval of these new shot types, the list of approved shot types for waterfowl hunting now includes bismuth-tin, iron (steel), iron-tungsten (two types), iron-tungsten-nickel, tungsten-bronze, tungsten-iron-copper-nickel, tungsten-matrix, tungsten-polymer, tungsten-tin-iron, tungsten-tin-bismuth, and tungsten-tin-iron-nickel.

IN SEASON

This month, this season is open in North Carolina:

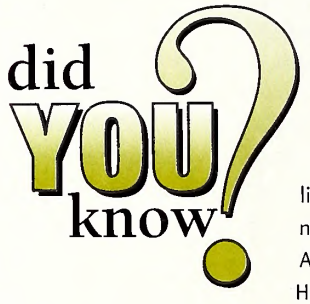
Wild Turkey: Continues through May 6.

Check the *2006–2007 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Ever considered the annual cost of protecting animals and plants protected by the Endangered Species Act? In 2004, 31 federal agencies and 50 states spent $1.4 billion on endangered species, including $793 million directed toward individual species. Of the remaining funds, $60 million went for land acquisition and $559 million for such activities as law enforcement and activities that benefited multiple species.

Among endangered and threatened species, more money was spent on chinook salmon — a little over $161 million — than any other species. Of the top 10 species for expenditures, seven were fish, two mammals and one a bird, the red-cockaded woodpecker, which is found in North Carolina.

In the 2004 fiscal year, 1,340 species were on the endangered list. Fish topped the spending list, receiving $475 million, followed by mammals ($122 million), birds ($103 million), reptiles ($42 million), flowering plants ($21 million), amphibians ($8 million) and insects ($7.5 million). Total spending represented a 17-percent increase over the previous year.



Among the species that received little funding were the Socorro springsnail ($100), pygmy sculpin ($200), Atlantic salt marsh snake ($700) and Hawaiian duck ($985).

Top 10 Species Expenditures

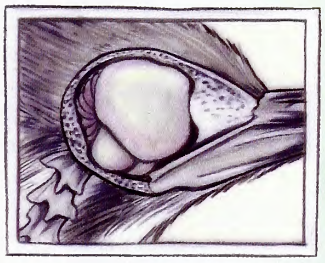
		Status	Total ($000)
1.	Chinook salmon*	E, T	$161,309.5
2.	Steelhead*	E, T	$117,380.4
3.	Steller sea lion*	E, T	$42,557.3
4.	Coho salmon*	T	$36,648.2
5.	Bull trout	T	$32,570.6
6.	Sockeye salmon*	E, T	$21,827.6
7.	Red-cockaded woodpecker	E	$14,125.1
8.	Pallid sturgeon	E	$13,370.2
9.	Chum salmon*	T	$13,257.9
10.	Right whale	E	$12,369.6

** Includes all subspecies*

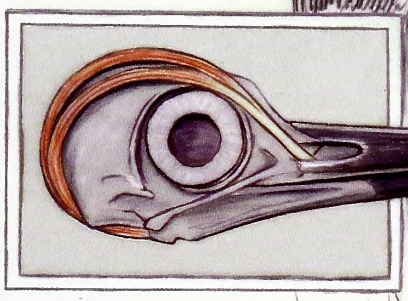
What Keeps A Woodpecker's Brain From Turning To Mush?

written by Clyde Sorenson
illustrated by Alison Schroeer

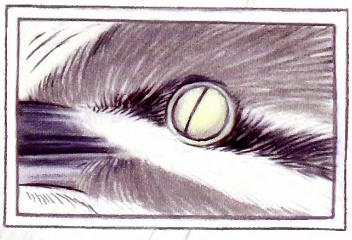
A WOODPECKER'S HEAD may decelerate at 1,000 times the force of gravity when its beak slams into solid wood. The bird strikes the tree with a very straight bill in a perpendicular stroke, reducing rotational and shearing forces that could crack the skull.



A woodpecker's skull is thicker than that of most birds: dense at the front and spongy where it attaches to the neck bones. The brain fits very tightly in the brain case, so it can't slosh around inside the skull. Because the bird's brain has small mass, it is less vulnerable to impact forces, much as a 1-ounce fishing sinker dropped from 3 feet strikes with less force than a 10-pound lead ball dropped from the same height.



Cartilage cushions at the base of the bill and special muscles that contract just at the moment of impact help transfer the immense force of impact to the bird's elastic neck muscles. The looping, muscular arrangement of the woodpecker's remarkable tongue may also function as a shock absorber.



The bird closes its tough eyelids just as its bill strikes, protecting its eyes from flying wood chips while preventing them from bulging out on impact. The bird also momentarily elevates the pressure in its eyes to keep its retinas from detaching!

Chariots of Fish

written by Jim Dean

Fishermen and hunters share a strong affection for old vehicles, especially those that spend their twilight years in deteriorating servitude (the vehicles, I mean). Packed with all our gear, they are mobile monuments to our obsessions and, more important, they symbolize the freedom to go anywhere on a whim (and maybe even return home if the notion strikes us and the transmission doesn't fall out).

JIM DEAN

I have written about some of my sporting chariots in past years, particularly a 1970 Maverick my kids named "Ralph." Ralph was already a dilapidated and homely piece of Detroit steel with 75,000 hard miles on the odometer when I bought it (him?) for $750. But aside from a dipsomaniac thirst for 30-weight, Ralph proved remarkably well suited for my purposes.

Loaded with camping, fishing and hunting gear, he and I frequently ventured north to the storied trout streams of Pennsylvania, east to the Outer Banks and west into the Smokies. When I finally sold Ralph in the mid-1980s, we had collaborated for an additional 148,000 miles, and his buyer paid the stunning price of $350 to assume his various assets and liabilities. I have never invested so little for so much fun, and that was particularly important at a time when 10 dollars was a weekend limit for groceries and gas.

"I figure there's no need to run a fine old dog into the ground just because he still loves to hunt."

I reluctantly parted with Ralph because my old friend Reid Bahnson offered to sell me his little green and white 1977 Bronco (which was already a cult classic). Within a week, I had filled it to the windows with gear, including maps of the Western Hemisphere from Alaska to Tierra del Fuego. With its 302 cubic inch V8, it got less than half the gas mileage of that Maverick, but it compensated by being fully capable of climbing anything it didn't fall off of. Not only could it handle the roughest trails as easily as it cruised an interstate, it provided me with instant acceptance in questionable company. For sure, there were no golf umbrellas in its gun racks, and it had the rare attribute of being somehow cute while exuding as much menacing attitude as a pan-head chopper or a self-propelled howitzer. Of course, I was careful never to mention that cane fly rods and a fine bottle of Rhone red might also be part of its cargo, or that I sometimes listened to classical music while driving it—no need to alarm the natives.

For years, I drove the Bronco regularly to the Pisgah National Forest to fish for trout where I explored the many near-vertical two-tracks from Upper Creek to Old House Gap. I'd put it in four-wheel low range, pop in a Willie Nelson tape and roll deliberately and happily into the clouds. For the past 10 years or so, however, I have mostly driven it on short fishing and hunting trips to the family farm. I figure there's no need to run a fine old dog into the ground just because he still loves to hunt, and I would hope my caretakers cut me the same slack when I'm eligible for antique tags.

I believe my most nerve-wracking adventure in that Bronco occurred the time Joe McDade (now dead, alas) talked me into driving down to Bill Crump's old home place to fish a remote stretch of Wilson Creek. This steep, boulder-clogged path had become a challenge to walk, much less drive, and ample proof of that could be found in the abandoned remains of Bill's 1924 Buick rusting away in a clump of rhododendron.

"That trail's been worked on recently," Joe argued. "We won't have no problems."

It turned out that Joe's idea of trail maintenance amounted to little more than chain-sawed gaps through the larger blow-downs, and before we were halfway to the creek, I thought Bill's Buick might have a permanent companion. But we finally got to the bottom and enjoyed a day of superb fishing for wild browns before we returned to the truck at dusk.

"See how nice it is to have a full cooler waiting for us, and to know we ain't got to walk back out?" remarked Joe.

We inched back up the trail, frequently dragging bottom on big rocks while teetering precariously on the brink of some black chasm. The trail couldn't have been any worse if I'd driven up the middle of the dry bed of Wilson Creek all the way through the gorge from Brown Mountain Beach to Mortimer. But we made it.

"Did you ever have any doubt?" Joe asked cheerfully (and with what seemed to be relief) when we finally reached the Forest Service road at the top.

"Well, there were a couple of times when I was thinking how interesting it would be to call AAA and tell them they were obligated by contract to send a tow truck down in there after us."

MONTY E. COMBS

Common water strider

OUTDOOR MOMENT

IN THE JUNE ISSUE

CLYDE SORENSON

BLOODSUCKERS
Being outdoors in our state means dealing with ticks. Learn how they live and how to avoid them.

DISAPPEARING PIERS
As coastal land values skyrocket, fishing piers are closing. Is angler access in danger?

SAVING WATER
In just 10 years, the Clean Water Management Trust Fund has preserved thousands of acres for the public good.

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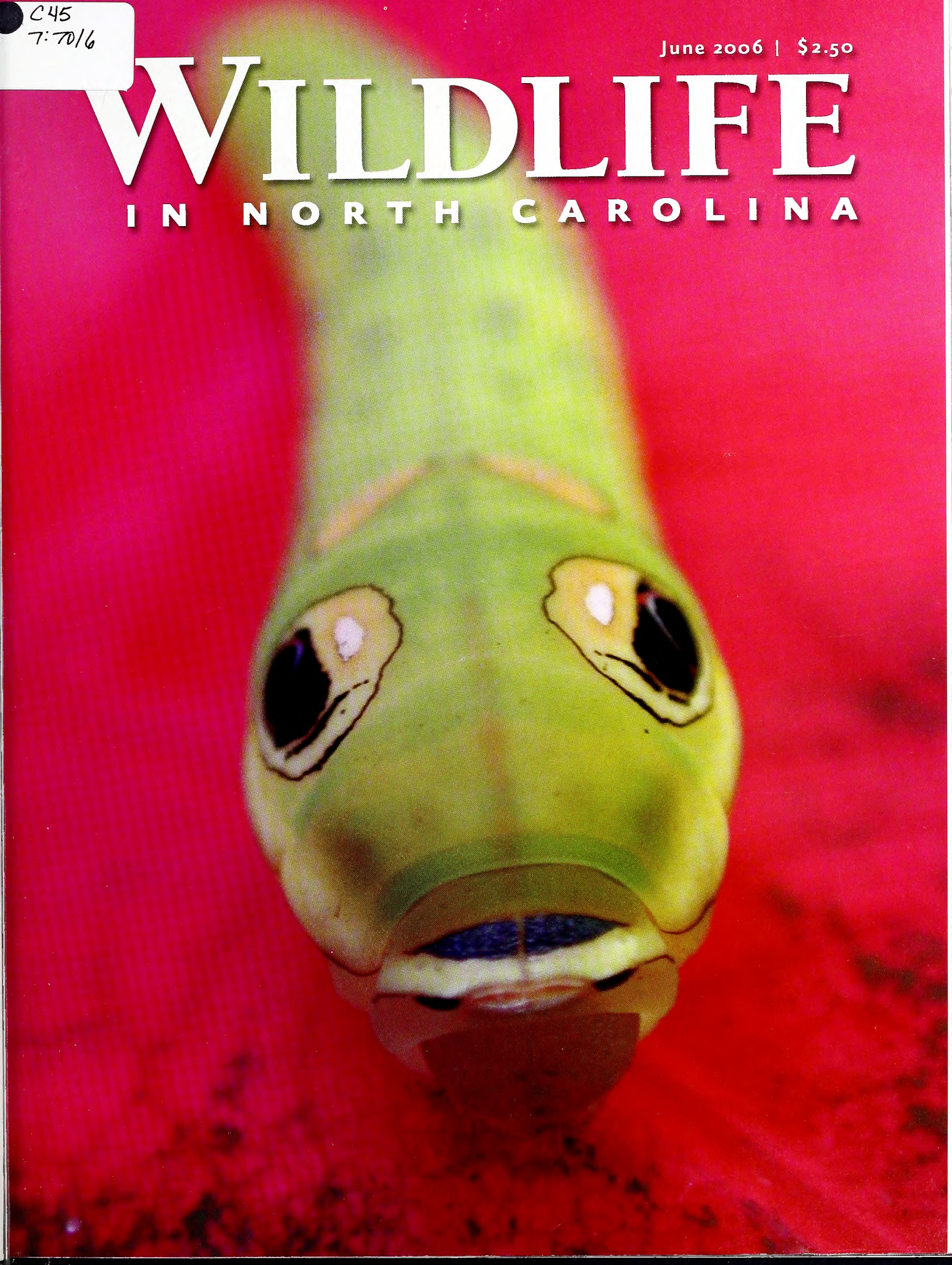
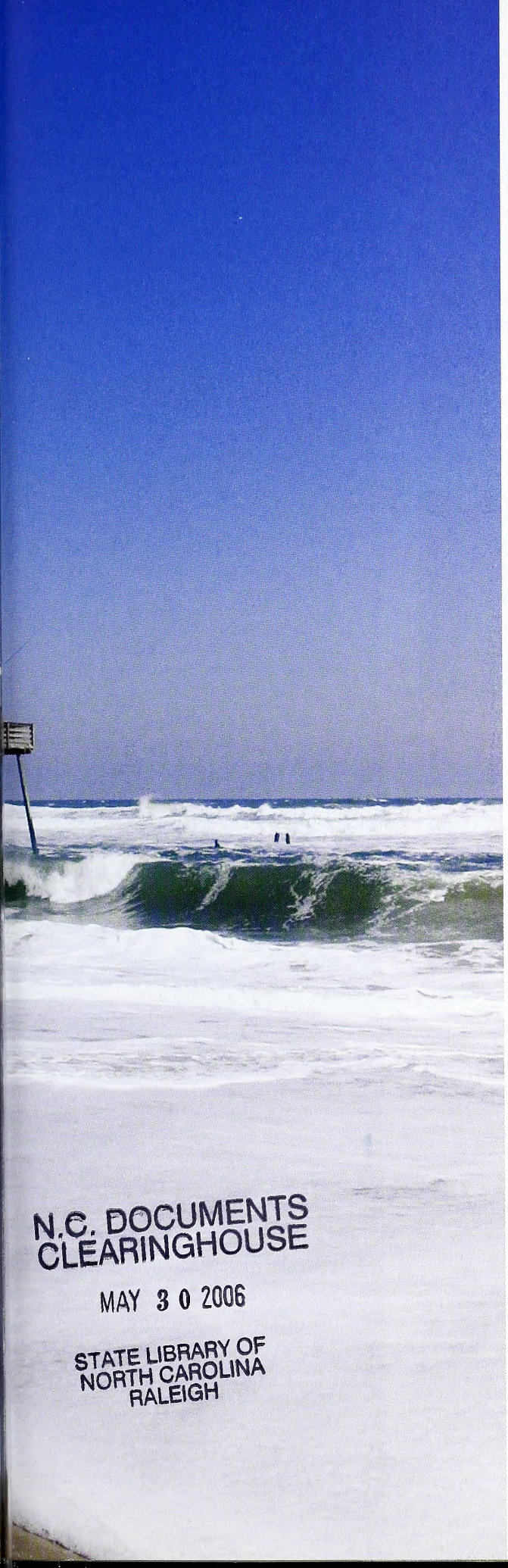
WILDLIFE IN NORTH CAROLINA



Although sheared off by Hurricane Isabel, Jennette's Pier in Nags Head has fared better than many N.C. piers. The N.C. Aquarium Society will rebuild it and keep it open. **PHOTOGRAPH BY JOE MALAT.**



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Volume 70 | Number 6

WILDLIFE IN NORTH CAROLINA

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Cover: This spicebush swallowtail caterpillar photo caught the judges' eyes in last year's photo competition. PHOTOGRAPH BY ALBERTO LINDNER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Sportsman's Pier was part of my childhood. As a little boy I was too wild much of the time to sit still and fish myself, but I loved to run up and down that big pier in Atlantic Beach and watch other people fish. Folks caught and kept oddball stuff like puffers, lizardfish and sea robins, and those weird fish were fascinating to a child.

There was a tank, right next to the one in which the live baitfish were kept, that housed the occasional small octopus, pretty spadefish or bright orange filefish someone reeled in. You could even see schools of fish in the water below the pier sometimes. Before the N.C. Aquarium at Pine Knoll Shores opened—and for decades before it became the premier fish-viewing spot in the state (see "Fish-Eye Lens," page 4)—Sportsman's Pier was the place I loved to go to see neat fish, both live and dead.

SCOTT TAYLOR

And not only was it free, no shirt or shoes were required as long as you weren't worried about snagging a toe on an exposed nail head. All you had to do was walk from the beach through the pier house, and you entered a different world. Jim Dean has written many times in this magazine about pier culture, so I won't attempt to describe it. But I recall that about half of the people on the pier had little interest in wetting a line themselves. They were there to see what others had caught, to get a good view of the beach from the end of the 1,000-foot span, or to stretch their legs a bit while soaking up the sun, salt air and the singular scent of fish out of water.

Even some of the anglers didn't seem to care if they caught a fish or not. As Herbert Hoover once said, "To go fishing is a sound, a valid, and an accepted reason for an escape. It requires no explanation." Sportsman's was an aquarium, a walking trail, a conservatory and a place to hide in plain sight. It will close this year, a victim of the trend of pier owners selling their property for development (see "Pier Pressure," page 22). I visited there in April, just to rubberneck one last time.

I hope someone will preserve the sign that graced the front of Sportsman's Pier for years. It contained a statement that is all too applicable to piers up and down the N.C. coast: "You should have been here yesterday."

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

JUNE 2006 VOLUME 70, NUMBER 6

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Skinks on Wheels

I thoroughly enjoyed the article about skinks by Jeff Beane ("Love Skinks," April 2006). He may be interested to learn that the five-lined skink has been the logo for our company for nearly 10 years. Located near Asheville, we manufacture high-end cycling components for road and mountain bikes. Keep up the great work. We love the magazine.

Tom Reeder
Cane Creek Cycling Components
Fletcher

No Joke

It was with consternation and disgust that I read the letter you published in the April 2006 issue ("Equal Time") portraying wildlife officers as buffoons. On the job, these officers have to grin and bear it when drunks or loudmouths spout such garbage. Officers should not be subjected to derogatory insinuations in the official publication of their employer. Any officer who has worked for a year has heard that sarcastic joke a hundred times—variations of it go back at least until 1958. By considering this disrespectful joke worthy of publication, you plainly exhibit the same disdain for wildlife officers as those who enjoy such trash at their expense.

Apparently you fail to realize that these are the people who have borne the brunt of criticism since 1947, the birth of the N.C. Wildlife Resources Commission, when conservation wasn't popular. We have endured and sacrificed mightily—some with their lives—to enhance the image of North Carolina's wildlife struggles. If letters from readers have deteriorated to the likes of that one, I suggest you remove that portion of the magazine and insert something more supportive of the commission's programs.

Capt. John R. Kennedy (Ret.)
Div. of Wildlife Enforcement
Whiteville

***NCWRC Executive Director Richard B. Hamilton:** John, I appreciate your strong objection to the joke in the magazine that seemed to demean the importance of our wildlife enforcement effort. I fully understand and respect the contribution and sacrifice of all of wildlife enforcement officers, past and present. The Wildlife Commission would not be here today without the thin green line of dedicated professionals who blazed the conservation trail.*

Wildlife Overseas

I am serving my last Air Force tour of duty deployed to southwest Asia in support of Iraqi/Enduring Freedom as my 20 years of active military service is coming to an end. My grandfather, Clifford Carden, has provided me with a subscription to your magazine for the past few years now. We used to vacation every Labor Day on White Top Mountain in Virginia, right on the border with northwestern North Carolina, and your magazine brings back many cherished memories from a time long ago. My grandfather and his best friend began the Labor Day ritual back in the 1950s and our families carried on the tradition until the late '80s when property owners and Christmas tree farmers eventually closed off access to the mountain.

We trout-fished the many backcountry streams and took in awesome scenic views from places such as Listening Rock and Pond Mountain. The best memories of my childhood were spent atop those mountain peaks across the Appalachians. I'm writing to say thanks for your publication and to also say thanks to my grandfather for seeing the importance of introducing a young boy and his cousins into the abundant natural resources of the Eastern Continental Divide and North Carolina. Keep up the great work!

Ronald C. Carden Jr.
Technical Sergeant, USAF

Chorus of Cheers

First I'd like to congratulate the staff on the excellent writing and photography in recent issues. The article "The Singing Hermit" by Dave Lee in the March 2006 issue brought back fond memories of an adventure some friends and I had more than 20 years ago.

Sometime back in the 1980s during the early fall, a hurricane passed through eastern North Carolina and crossed the western end of Albemarle Sound near Edenton. Some birding friends and I, living in Raleigh at the time, came up with the wild idea of driving down to Edenton the night of the hurricane with the idea of spotting multitudes of shearwaters and other pelagic birds brought ashore by the storm.

We left Raleigh in the predawn hours, hoping to get to the sound at first light. We almost didn't make it, dodging downed power lines, fallen trees and other debris blocking the road. Undeterred and obsessed with our harebrained notions of seeing "lifer" birds, we finally made it to the N.C. 32 bridge. After all that trouble we didn't see a single pelagic bird, of course, but we did encounter an ecological phenomenon we hadn't experienced before—thousands upon thousands of spadefoot toads in a roadside mating orgy.

The deafening chorus of these amphibians was truly amazing, apparently stimulated by the sudden drop in atmospheric pressure. Even though we didn't see any birds, the crazy adventure was an unforgettable experience for us. Spadefoot toads are a wonderful part of our natural heritage.

J. Merrill Lynch
Apex

write us

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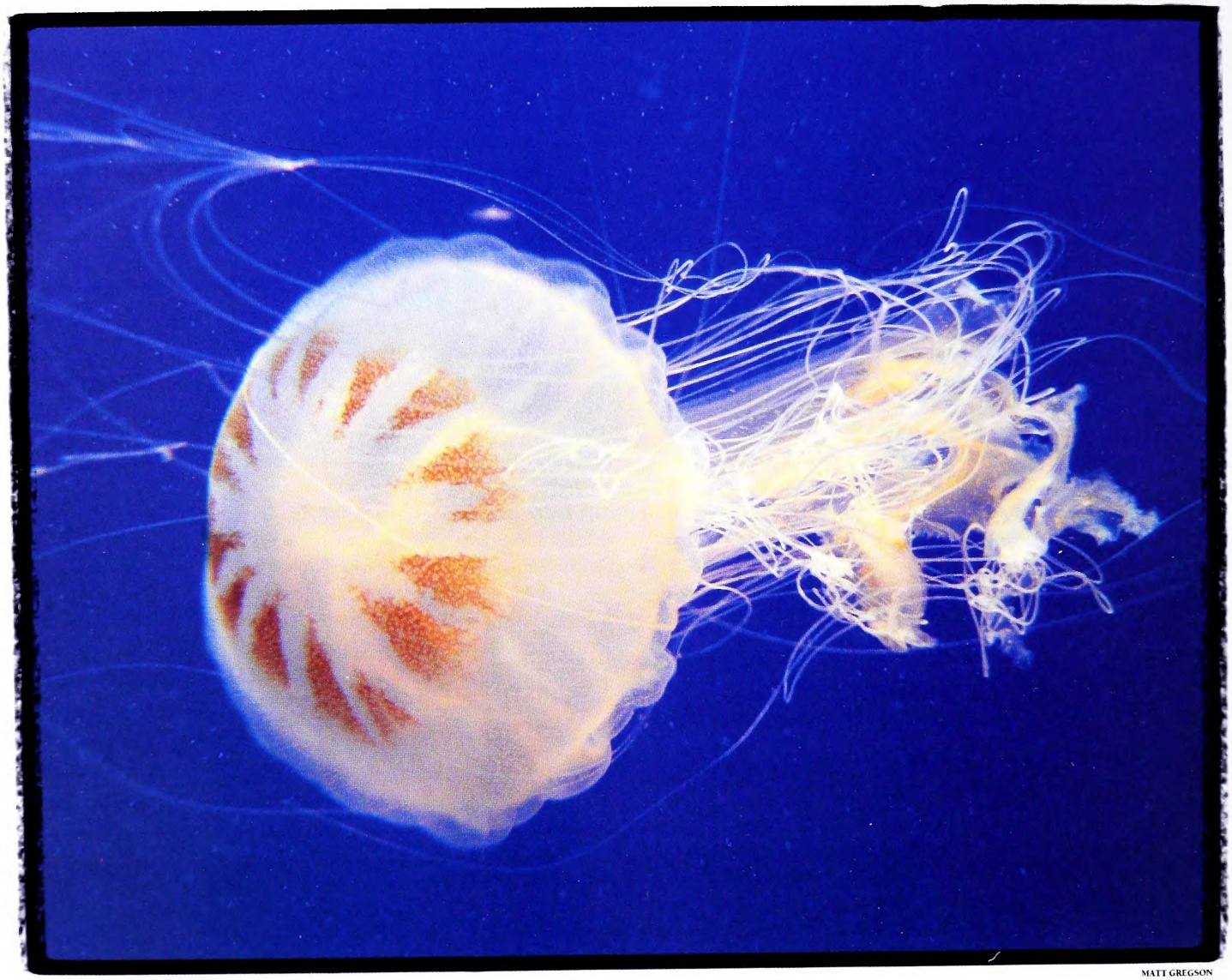
Fish-Eye Lens

Written by Julie Powers



MATT GREGSON

The new N.C. Aquarium at Pine Knoll Shores is a family-friendly tourist destination and an audacious improvement on the original facility. An expanded focus highlights aquatic environments across the state.

It is an aquatic adventure story, natural science lesson and travelogue. Dozens of exhibits and thousands of animals depict compelling life-and-death sagas from the smallest mountain brook to the open ocean.

But the new North Carolina Aquarium at Pine Knoll Shores also serves as a 93,000-square-foot mirror. At every turn visitors can see themselves and their role in the future of vital ecosystems. The aquarium is dedicated to inspiring appreciation and conservation of North Carolina's aquatic environments, a mission shared by its sister state aquariums at Fort Fisher and Roanoke Island.

Though the message is serious, the delivery is far from solemn. Educational motives and methods skillfully and often invisibly underpin every exhibit and activity, but many visitors focus on fun. "Families visiting the aquarium are usually looking for an entertaining way to spend time together," says aquarium director Jay Barnes. "But when they leave, they often take with them a new sense of wonder and a better understanding of the world around us."

Approaching its 30th anniversary this year, the aquarium in May unveiled a $25 million expansion that tripled its size. A new, broader theme, "North Carolina's aquatic life from the mountains to the sea," emerged with the renovation, which spanned two and a half years. Five galleries—Mountain, Piedmont, Coastal Plain, Tidal Waters and Ocean—lead visitors on a journey from the state's grand peaks to the Atlantic, much as a raindrop makes its way to the sea.

"The individual exhibits show visitors how each animal relates to its environment," says Barnes. "And the arrangement of the galleries reflects how all the environments are connected." An 8-foot three-dimensional relief map of the state helps orient visitors at the entrance. A roaring three-story mountain waterfall marks the start of the passage. The 306,000-gallon Living Shipwreck, containing a 70-foot submarine replica, punctuates the grand saltwater finale.

Large as life

Much of the new aquarium is about big and bigger. The Living Shipwreck is the largest aquarium tank in North Carolina. The biggest display at Pine Knoll Shores before the renovation contained 12,000 gallons of water. A green moray eel in the Living Shipwreck is 6 feet of thick, eerily iridescent muscle—near the top of the length range for the species. The sand tiger sharks in the same exhibit measure up to 8 feet long. Their need for long glide room and rounded corners in part drove the design for the huge tank. The sand tigers share the water with other shark species, as well as triggerfish, stingrays, groupers, barracuda and hundreds of other fishes and marine animals typically drawn to offshore shipwrecks.

JOHN MAUSER

N.C. AQUARIUMS

Top: A boardwalk leads visitors to marshy habitat on the Bogue Sound side of the aquarium. Bottom: Aquarium director Jay Barnes inspects the replica of the *U-352* before the Living Shipwreck tank is filled.

A 3/4-size replica of the coral-encrusted *U-352*, listing to starboard on the sandy bottom, dramatically symbolizes the fusion of human conflict and aquatic opportunism. The German World War II submarine rests about 25 miles off Cape Lookout, where the U.S. Coast Guard sank it in 1942. U-boats commonly preyed upon merchant ships along the North Carolina coast during the war, a reality still not widely known more than 60 years later. Another aquarium exhibit, The Wreck of the *Caribsea*, represents an American freighter torpedoed in 1942 by another U-boat just 18 miles off the cape.

The 50,000-gallon Queen Anne's Revenge tank in Tidal Waters reaches farther back in maritime history. A 1996 diving expedition found an intriguing field of 18th-century maritime wreckage near Beaufort Inlet. The artifacts are believed to be from a ship once commanded by the infamous pirate Blackbeard. In a realistic recreation of the scene,

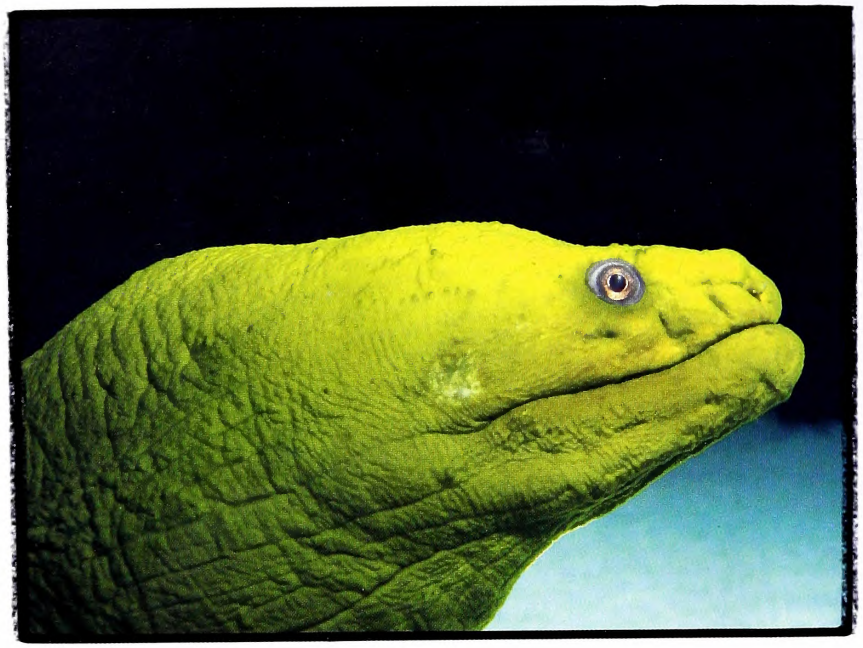
Expansion Comparisons

Largest display
Before: 12,000 gal. · After: 306,000 gal.

Square footage
Before: 29,000 · After: 93,000

Full-time staff
Before: 14 · After: 45

Annual visitation
Before: 250,000 · After: 500,000 + (projected)



JACOB RUDOLPH

N.C. AQUARIUMS

A green moray eel and tiger sharks are some of the impressive creatures living in the aquarium's 306,000-gallon Living Shipwreck tank. Triggerfish, stingrays and barracudas are also housed there.

Capturing Creatures that Capture Attention

The N.C. Aquarium at Pine Knoll Shores broadened its focus when it reopened May 19. The new theme, "North Carolina's aquatic life from the mountains to the sea," leads visitors through five galleries showcasing the state's major aquatic zones.

The aquarium's husbandry staff ventured into each of those zones many times to gather the thousands of animals in the exhibits. Commercial fishermen assisted with the quest along the coast. "We saw lots of sunrises with some of the area pound-netters," says Stuart May, director of husbandry and operations. "Having us aboard made their work harder, but they helped us a great deal in getting what we wanted for the exhibits."

Prior to the renovation, the aquarium featured mostly marine and coastal creatures. After learning more about freshwater habitats and inhabitants, the staff had to choose what to exhibit. At 93,000 square feet, the aquarium is three times larger than before the expansion. But no building can contain all the wonders of water and wildlife in the state.

"North Carolina's biodiversity is amazing," May says. The husbandry staff sought expertise from the N.C. Wildlife Resources Commission for some of the freshwater selections. "They helped us choose the species that are compatible but still convey the complexity of these different ecosystems," May says. The Division of Inland Fisheries also assisted aquarists with identifying fishes and tracking down sources for muskies, smallmouth bass, walleye and other species. Wildlife Commission personnel also helped the aquarium make connections to capture two young North American otters, now named Neuse and Pungo.

Other aquariums donated many animals, and fishermen, pier owners and recreational divers contributed also. The aquarium had to be vacated when it closed in December 2003. The aquarium staff temporarily relocated to an empty supermarket building and began gathering animals as soon as holding tanks were installed. The two other N.C. Aquariums, at Fort Fisher and Roanoke Island, kept some animals for Pine Knoll Shores during the closure, as did aquariums in other states.

nurse sharks, sea turtles, cobia, bluefish, drum and other animals circle replicas of half-buried cannons, ballast stones and a rusted anchor.

Sunken vessels such as these form the foundations for complex marine communities. Corals, barnacles and sponges attach to the debris. Small fishes seek shelter in the recesses. Larger predatory fishes, octopus, eels and sharks expand the food web. "Shipwrecks are an important part of our history here," says Barnes. "They also create incredible reefs."

Its abundance of shipwrecks has earned North Carolina a reputation for some of the world's best recreational shipwreck diving. Both the *Caribsea* and the *U-352* are popular dive sites. The N.C. Underwater Archaeology Branch sometimes allows restricted, guided educational dives at the Queen Anne's Revenge site. The aquarium offers a fun alternative for those without the time and training for scuba diving.

"The exhibits give visitors the feel of exploring these wrecks without getting wet," Barnes says. Divers chat with visitors through underwater microphones. Three viewing windows, one of them 63 feet long, frame the constant swirl of color and motion around the submarine. A concave cylindrical window at one end gives the sensation of being inside the tank.

Splendor in small packages

Wonder comes in all sizes and shapes at the aquarium. Visitors can study animals that live in remote and inaccessible settings, and creatures that are too tiny, skittish or swift for the average person to get a good look at. The Tidal Waters and Ocean galleries permit glimpses of nature's performance art. Seahorse, lionfish, octopus and jellyfish exhibits each present an intimate look at the stunning form and grace of these animals.

In the Mountain Gallery, the Mountain Minnows exhibit highlights the surprising number and diversity of these miniature, colorful and critical components of cold-water communities. Two North American river otters mesmerize their audience as they swim and play in their Piedmont Gallery riverbank setting. In the Coastal Plain Gallery, the primitive longnose gar adds to the quiet mystery of the Cypress Swamp. Even animals and settings often taken for granted become extraordinary when viewed close-up—for example, red-belly water snakes in highway ditches in the Coastal Plain Gallery's Roadside Wonders exhibit.

Vivid interpretive graphic panels help bring these stories to life. With bold, colorful images and large type, the 42-by-68-inch panels are designed to appeal to visitors of all ages. Many include a "Did You Know?" footnote with intriguing little-known facts.

For many visitors magic happens when their fingertips meet marine creatures in the Tidal Waters Gallery. Visitors at the Skate and Ray Encounters widen their eyes in surprise when they first feel the velvety skin texture of these agile animals. The barbs have been humanely removed from the stingrays. Horseshoe crabs, hermit crabs, spider crabs, sea stars, sea urchins and whelks draw crowds at the Tidal Touch Pool.

That kind of contact turns the marine environment into a personal experience, the N.C. Aquariums' philosophy integrated throughout. The shipwreck displays replicate actual sites. Other exhibits represent familiar places with recognizable names—Bogue Sound Salt Marsh, Fort Macon Jetty and Falls Lake Reservoir, to name a few. "That connection is so important," Barnes says. "It helps bring home the message, once again, that we are part of much greater whole."

Education in action

Participatory exhibits include a model of an oversized hermit crab in a 6-foot horse conch shell that allows children to crawl inside and peek out from the crab's head. Visitors also can climb aboard a toothy, open-mouthed, mounted alligator. Puppets patterned after crabs, pelicans and sharks interact with children in a realistic Pier Piling Puppet Theater. "They can be fun and playful," says exhibits

N.C. AQUARIUMS

TOM GILLESPIE

JACOB RUDOLPH

Getting Visitors Hooked

Anglers have found their favorite spot at the new N.C. Aquarium at Pine Knoll Shores. Daily programs and demonstrations in the Sportfishing Gallery detail the various game fish species that dwell in each region of North Carolina and the gear, bait and techniques to catch them. Visitors can view clips from UNC-TV's "Carolina Outdoor Journal," pictures of state record catches and information on the area's history of sport fishing on a big-screen monitor, get tips and advice from local fishermen and even learn to tie flies from an expert.

The gallery features a full-sized transom of a sportfishing boat that doubles as a teaching station, complete with a fighting chair. The transom also has a working sink, which comes in handy for fish filleting demonstrations.

Top: Inspecting cannons that are part of the Queen Anne's Revenge tank. Left: Otters and seahorses are on display. Bottom: A three-story mountain waterfall welcomes visitors.

JOHN MAUSER

N.C. AQUARIUMS

SANDY SMITH

Sea nettles and lionfish are two beautiful but dangerous creatures housed at the aquarium. Visitors can touch less dangerous animals such as horseshoe crabs and sea stars in the Tidal Touch Pool.

curator Georgia Minnich, but such props are also true to the creatures and habitats they represent.

Authenticity is a guiding principle in the aquarium's exhibits. The ledge fronting the River Otter exhibit is crafted to resemble a mud bank, and visitors can put their fingers into tracks imprinted by molds taken from real otters.

The aquarium's creative education staff knows how to make nature competitive with today's electronic entertainment. Hands-on demonstrations and experiments in two new and innovative classrooms are conduits for lessons in natural history and environmental processes. Alligators, snakes and other stars of the live-animal programs are silent ambassadors for their environments.

"Visitors might think they are coming to the aquarium just to look at fish," says education curator Windy Arey Kent. "But while they are playing a game, making a craft or participating in a live-animal program, they learn something about the conservation of a species or the state of an ecosystem."

The N.C. Aquarium's schedule of "hands-on, feet-wet" adventures grew with the expansion. Summer camps for children serve grades 2 through 9. Other special activities for all ages take advantage of the aquarium's extraordinary natural setting with snorkeling trips, kayaking and canoeing excursions, onboard collecting cruises, wildlife watching cruises, marsh explorations, clam and crab harvesting expeditions and even surfing lessons. Two splendid nature trails wind through the Roosevelt Natural Area. After hours a group can even arrange an aquarium slumber party through the Sleeping with the Fishes program.

The aquarium's innovative programs, new exhibits and bigger building are expected to attract at least 500,000 visitors annually, twice the yearly attendance before the renovation. But the aquarium's main appeal is still based on an age-old natural attraction. "People are fascinated by water and its inhabitants," Barnes says. "We turn that fascination into a learning experience." ◆

Julie Powers is the public relations coordinator at the N.C. Aquarium at Pine Knoll Shores.

N.C. AQUARIUMS AT A GLANCE

History

The N.C. Aquarium at Pine Knoll Shores is one of three state aquariums under the N.C. Aquariums Division, part of the state Department of Environment and Natural Resources. The division also operates the aquariums at Fort Fisher and Roanoke Island. All three aquariums are accredited by the American Zoo and Aquarium Association.

The aquariums opened in 1976 as N.C. Marine Resources Centers. The names changed in 1986, and the facilities broadened their focus to include more public education. Visitation increased dramatically in the next few years with the rise in tourism, prompting major renovations at all three sites (see "Water Worlds," June 2003).

Mission

"Inspiring appreciation and conservation of North Carolina's aquatic environments." Shared by all three state-operated aquariums.

Themes

- N.C. Aquarium at Fort Fisher–"Waters of the Cape Fear"
- N.C. Aquarium at Pine Knoll Shores–"North Carolina's Aquatic Environments from the Mountains to the Sea"
- N.C. Aquarium on Roanoke Island–"Waters of the Outer Banks"

Worth the Wait

The N.C. Aquarium at Pine Knoll Shores is the last of the three state aquariums to undergo expansion. Roanoke Island unveiled the results of its two-year renovation in 2000. Fort Fisher followed in 2002. The new Pine Knoll Shores aquarium originally expected to debut soon after.

However, Pine Knoll Shores was only a few weeks from bidding the construction contract when Hurricane Floyd flooded eastern North Carolina in 1999. The state diverted the $15 million designated for the expansion into the massive hurricane recovery effort. Then the economy slumped, and funding for the Pine Knoll Shores plans stalled.

In response, the N.C. Aquariums Division and the N.C. Aquarium Society—a membership-based nonprofit support organization for all three aquariums—forged a public-private partnership to revive and improve the plans, adding $10 million to the budget.

Aquarium staff and architects revised the original design, taking advantage of lessons learned from construction at Roanoke Island and Fort Fisher. Construction began in January 2004, and the new Pine Knoll Shores facility opened May 19.

IF YOU GO

Hours: 9 a.m. to 5 p.m. daily; 9 a.m. to 9 p.m. Thursdays in July for Family Night. Closed Thanksgiving Day, Christmas Day and New Year's Day.

Phone: (252) 247-4003; 1-866-294-3477
Admission: $8 adults, $7 ages 62 and over; $6 children ages 6 to 17. Children 5 and under, members of the N.C. Aquarium Society and registered North Carolina school groups admitted free. Free admission on Veterans Day and Martin Luther King Jr.'s Birthday. (Admission fees and policies are the same at all three N.C. Aquariums.)

Web site: www.ncaquariums.com

Directions: The aquarium is 5 miles west of Atlantic Beach. From N.C. 58, turn onto Pine Knoll Boulevard at the stoplight at Milepost 7, then turn left onto Roosevelt Drive.

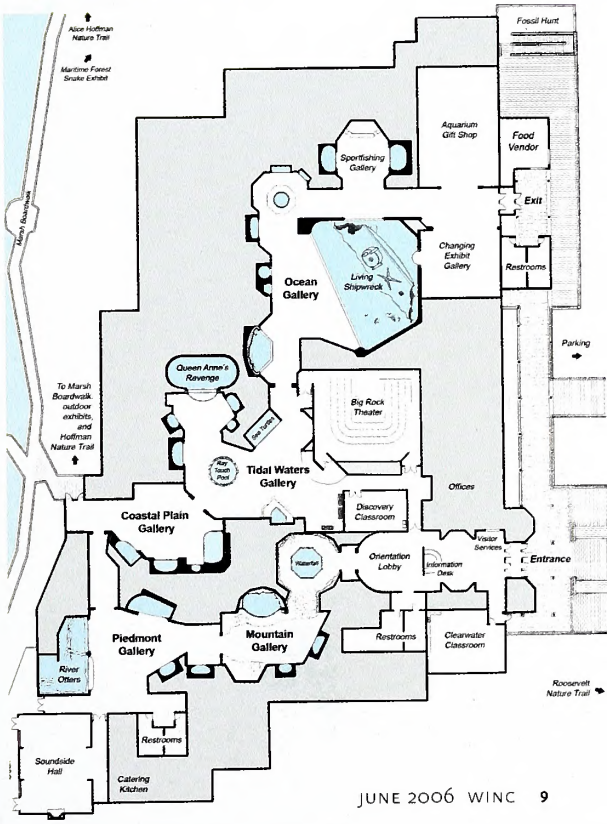
Accessibility: The parking lot, entrance, exhibits and restrooms are wheelchair accessible. Some outdoor facilities also are wheelchair accessible.

JOHN MAUSER

JOHN MAUSER

Top: Animals were housed in an old grocery store while the new aquarium was being built. Bottom: Aquarium staff move fish from holding tanks to their new homes.

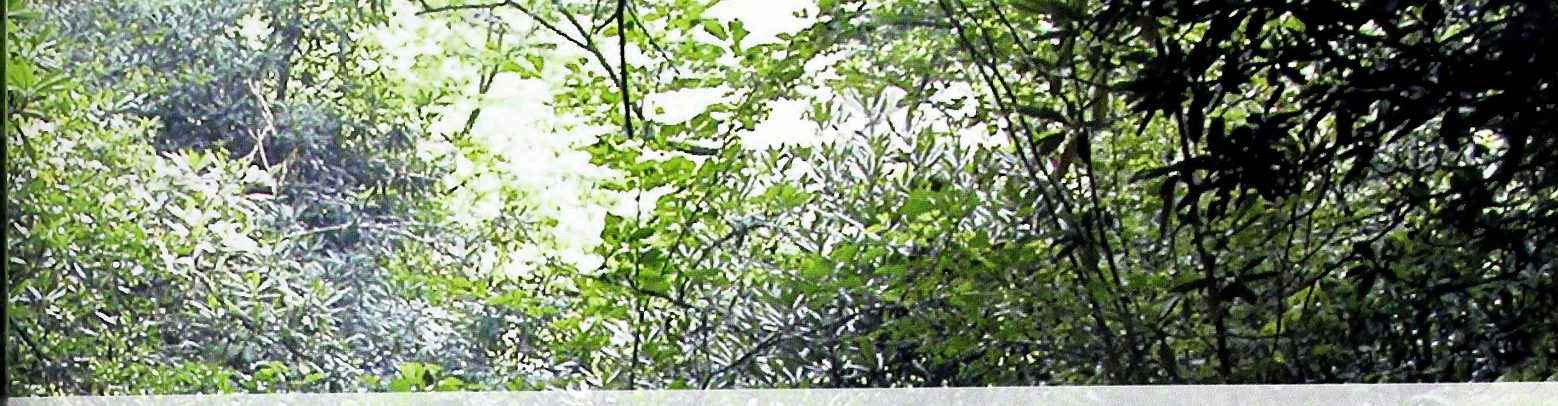
Aquarium Floor Plan



Protecting *Water*, Preserving *Land*

Now in its 10th year, the Clean Water Management Trust Fund has protected much more than just precious water resources. It has facilitated significant increases in state game lands and other areas designated for outdoor recreation.

written by *John Manuel*



State Senator Marc Basnight stands at the edge of Beaufort County's Van Swamp Game Land with Tommy Hughes, a biologist with the N.C. Wildlife Resources Commission. They are admiring this recent acquisition to the state game land system, purchased with a grant from the Clean Water Management Trust Fund.

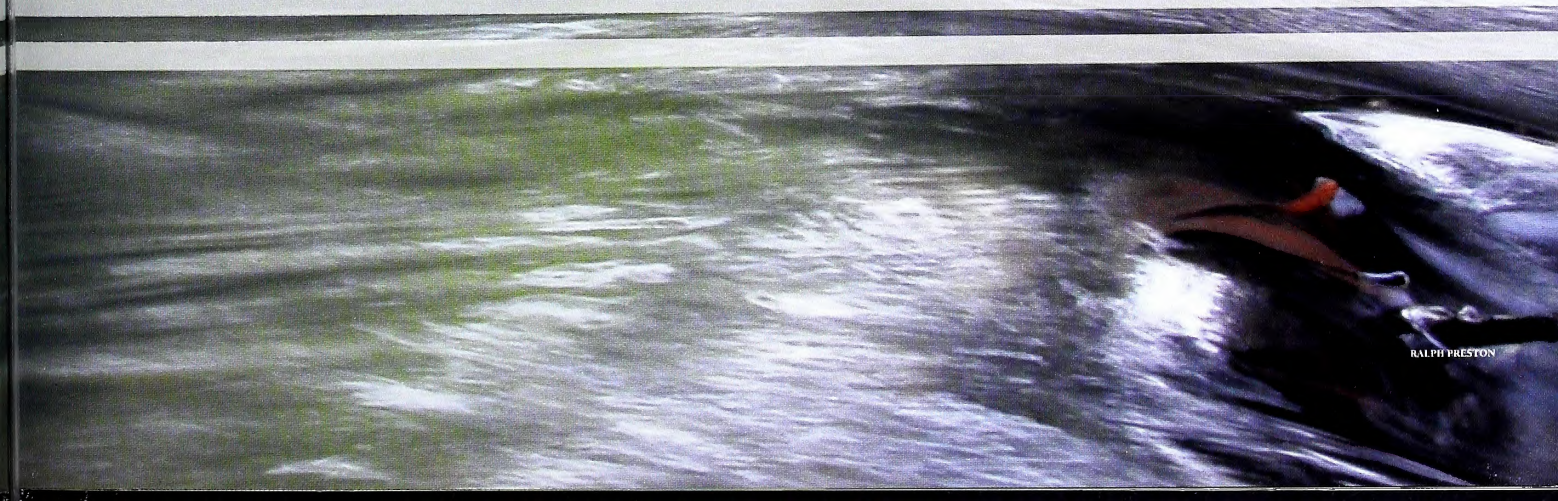
"They say everything east of U.S. 17 is liable to be developed in the future," Hughes says. "A few years from now we would have had to pay a lot more for this land if we could have gotten it at all."

Basnight nods. "The land we protect today will be the green islands of tomorrow," he says. "What we need to do is connect them with corridors so wildlife can migrate from one to another."

Two hundred miles west, Roy Maness, mayor of Troy, strides among the mountain laurel and hollies along Densons Creek. A spring wind whispers among the rhubarb-colored buds of the red maples. A whitetail buck has recently crossed the trail, leaving its hoofprints still filling with water.

"I used to play in this stream as a kid," Maness says. "It's just as clear and clean as it was then. You could wade in there right now and catch a mess of redbreasts, some jack and maybe a few bass. We never would have been able to save it without the Clean Water Management Trust Fund."

Clean Water Management Trust Fund—the name doesn't exactly roll off the tongue. It is often referred to in conversation simply as "Clean Water" and in print by its initials, CWMTF. The agency is little known to the public. Yet it is the darling of many conservation groups, municipalities and state agencies who are leveraging its funds to make key purchases of land as well as improvements to wastewater, stormwater and drinking water systems. "I think the Clean Water Management Trust Fund is one of the best programs the legislature has ever funded," Maness says. "It's tax money well spent."



RALPH PRESTON

A. MACK SAWYER

Top: Sen. Marc Basnight talks with Wildlife Commission biologist Tommy Hughes at Van Swamp Game Land. Immediately below: Turkey hunter Russ Chappell enjoys using North River Game Land. Bottom: Another look at North River Game Land.

MELISSA McGAW

MELISSA McGAW

"I BELIEVE if you can get ownership [of a program] in a **community,** you'll get **community support.** You won't get that with **REGULATIONS."** –state Senator Marc Basnight

Celebrating its 10th anniversary this year, the fund was the brainchild of Basnight, who was convinced that some vehicle other than state and federal regulations was needed to preserve water quality for North Carolinians. "I believe if you can get ownership [of a program] in a community, you'll get community support," Basnight says. "You won't get that with regulations."

CWMTF was established in 1996 as an incentive-based program that complements North Carolina's regulatory and educational efforts. It is an independent agency run by a 21-member board of directors, seven of whom are appointed by the governor, seven by the General Assembly on recommendation of the president pro tempore of the senate, and seven upon recommendation of the speaker of the house. The board establishes the criteria for funding, reviews applications and approves grants. Lots of them.

As of the end of 2005, CWMTF had awarded 781 grants totaling nearly $600 million. Those grants leveraged another $906 million in private and other public funds. By law, money is to be used to help finance projects that specifically address water pollution problems and/or protect and conserve unpolluted surface waters. But the benefits of the projects often extend beyond water quality to include a wide range of environmental and recreational activities.

A BOON FOR GAME LANDS

One of the biggest recipients of CWMTF funds has been the N.C. Wildlife Resources Commission, which has garnered nearly $77 million for 49 projects across the state. "The reason is that we have the ability to manage land," says Hughes, the Coastal Region supervisory wildlife biologist for the Division of Wildlife Management. "We can provide enforcement, habitat restoration and monitoring."

Trust fund money is often used to purchase riparian buffers and wetlands, which are leveraged by other funds to buy adjacent upland property. These lands are then incorporated into the state's game land system and managed according to its regulations.

A prime example has been the addition of nearly 4,000 acres to the North River Game Land in Camden County. North River is a relatively unpolluted body of water that transitions from freshwater to brackish tidal basin as it merges with Albemarle Sound. The vast marsh surrounding the river shelters some of the last remaining stands of Atlantic white cedar and provides habitat for some of the state's rarer neotropical songbirds, including breeding populations of black-throated green warblers, Swainson's warblers and worm-eating warblers. The original game land, which lies mostly on the east side of the river, provides excellent waterfowl, deer and turkey hunting but has been largely inaccessible to the public except by boat.

In 2000 the Harrison family offered for sale a tract of timberland and fields on the west side of the river that is readily accessed from Sandy Hook Road. CWMTF provided a $534,360 grant to purchase 720 acres bordering the river, and the N.C. Natural Heritage Program supplied an additional $2 million to secure the remaining acreage. The land was turned over to the Wildlife Commission to put into the game land system.

Russ Chappell, a resident of nearby Camden and an avid turkey hunter, is not familiar with CWMTF, but he is thrilled with the addition to the North River Game Land. "The commission has put in gates and a parking area, they've graded the road back to the fields," Chappell says. "Before this you couldn't hardly drive back there."

The Wildlife Commission is currently building three waterfowl impoundments on the Harrison tract using grant funds from the North American Wetlands Conservation Act and the Environmental Enhancement Grant administered by the N.C. Attorney General's Office. North River Game Land is open six days a week. Turkey hunting is by permit only. This past season, 40 turkey permits were available.

BEST OF THE WEST

Burt Kornegay is deeply appreciative of the Clean Water Management Trust Fund for other reasons. Kornegay is owner of Slickrock Adventures, based in Cullowhee. He conducts regular guided canoe trips down the Little Tennessee River, which runs undammed for 28 miles from Lake Emory near the town of Franklin to Fontana Lake. Most of that section of river is bordered by a 4,468-acre block of land known as the Needmore tract, long owned by Duke Power. Duke entertained the possibility of one day damming that section of river for power generation. Meanwhile, the river flowed free and the land remained undeveloped, a haven for wildlife and a favorite haunt of local youth, hunters, fishermen and canoeists.

"The Little Tennessee offers the best remaining patch of wilderness canoeing in our mountains," Kornegay says. "You start out in a pastoral landscape at the Iotla Bridge. As you enter the Needmore tract, the Cowee Mountains crowd in from the east and the Nantahala Mountains from the west. The land gets wonderfully forested with mixed hardwood, white pine and hemlock. It's a good wild feel you don't get elsewhere in western North Carolina."

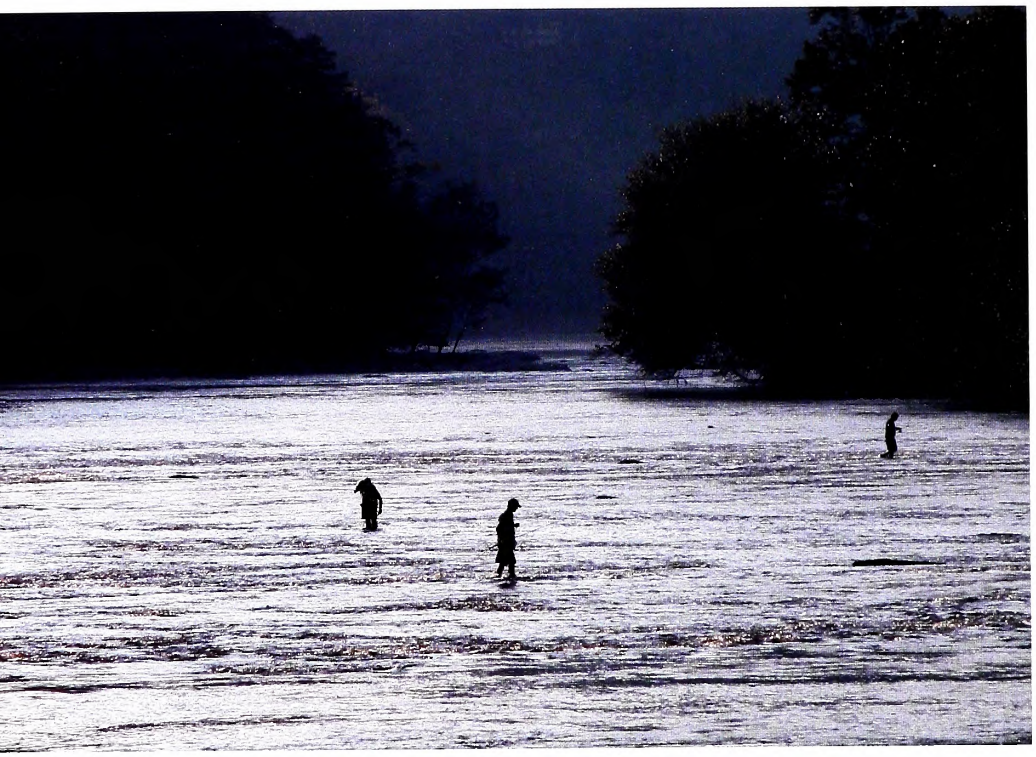
Not only is the land unique, so too, are the river and its denizens. This section of the Little Tennessee is classified by the state as Outstanding Resource Waters. The clean, clear water provides habitat for a host of rare mussels, two of which are on the federal endangered species list, and a half dozen rare fish, including the federally listed spotfin chub. The Little Tennessee offers excellent smallmouth bass fishing, and the surrounding woods support healthy populations of wild turkeys, deer and bears.

In 1999 Duke Power transferred ownership of the Needmore tract to Crescent Resources, the development arm of Duke Power Company. Though the company did not officially announce plans to sell or develop the tract, locals feared that the land would be subdivided for upscale mountain homes. Conservation groups, including The Nature Conservancy and the Land Trust for the Little Tennessee, sprang into action, seeking grants and private donations to secure at least part of the land. In 2002 Crescent Resources offered the state a one-year option to purchase the entire tract for $19 million. The Clean Water Management Trust Fund contributed $6.6 million, and an assortment of other state, federal and private entities provided

Showy orchids and ospreys make up part of the flora and fauna found at Needmore Game Land in Swain and Macon counties.

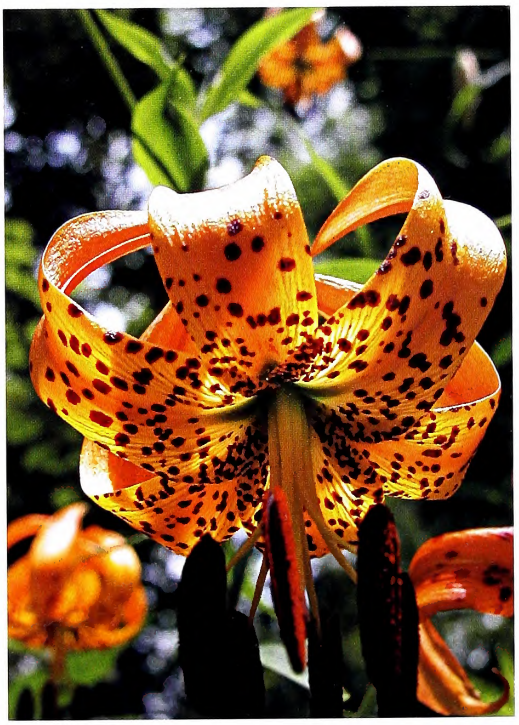
MELISSA McGAW

MELISSA McGAW



RALPH PRESTON

RALPH PRESTON



RALPH PRESTON

The Clean Water Management Trust Fund's money protects the Little Tennessee River for fishing in perpetuity, and preserves riparian buffers that in turn keep the river free of sediment. The Turk's cap lily blooms throughout the Needmore Game Land.

another $13 million to save the day. The land was purchased in 2003 and turned over to the Wildlife Commission.

Not only is CWMTF's action credited with helping save the Needmore tract, but it also has breathed life into the local land trust. "Needmore is part of a much bigger story of clean water preservation in the area," says Paul Carlson, executive director of the Land Trust for the Little Tennessee. "A year before that deal closed, the trust fund helped us purchase a lot next to that tract that was going to be an RV park with [its own small sewage] treatment plant. We have another mile of riverfront land adjacent to the Needmore tract that we are going to purchase from Crescent this fall. The trust fund is the engine for all this."

And the deal has united the often disparate aspirations of local political, recreational and conservation groups. "Everyone in this area got behind this—the [National] Wild Turkey Federation, fishing groups, the Swain County commissioners," Carlson says. "The deal changed the view of conservation. Up until then, the assumption was [Macon and Swain] counties had enough public land. The Needmore tract hit at a time when people realized that not enough land was conserved. Now conservation is not just accepted, it's looked on as important public policy."

The Wildlife Commission has designated the Needmore tract as game lands and is formulating a plan to manage the area, closing off ATV trails that contribute to erosion and unofficial roadside campsites plagued with litter. Meanwhile, canoeists like Kornegay continue to enjoy the view from the river, and the turkeys, deer and bears roam the woods without fear of tripping the floodlights on a McMansion.

LOCAL MOTION

After the Wildlife Commission, the largest recipient of CWMTF money is local government. Funds are often used to repair and improve wastewater treatment systems, which certainly benefit downstream users. Local governments have also used funds to create buffers along streams and to establish recreation areas, as is being done in Troy.

The impetus for Troy to take action was the threat of development along a pristine waterway. A landowner announced plans to

build a trailer park along a wooded section of Densons Creek. Mayor Maness could not stand the thought of his childhood haunt being compromised. Troy, a mill town that has lost many of its major employers, did not have the resources to purchase more than a small fraction of the land. So it turned to CWMTF. The agency awarded the town the first of several grants totaling $1.6 million in 2000. The town began purchasing land along the creek that same year and has now protected 17 miles of shoreline.

Maness has nothing but praise for the state agency. "The Clean Water Management Trust Fund is extremely easy to work with," Maness says. "If you can show that you are eager to protect the land, they will come in and help you through the process. It's the only way for a small town like us to save a stream."

"I believe the trust fund has been a real catalyst for water quality improvements across the state," says Bill Holman, CWMTF executive director. "A town like Troy had the vision but didn't have the resources to make it happen. We have been able to help a lot of towns and counties turn their vision into reality."

One of the criticisms occasionally aimed at the trust fund is that lands purchased with public money don't always allow for public access. This is not the case with Densons Creek. The town is establishing trailheads with parking areas at each of the bridge crossings. Seven miles of trail has already been constructed, tying into a 279-acre nature preserve and wheelchair-accessible lake. The town's long-range goal is to purchase land along another 7 miles of creek, connecting it with the 50,000-acre Uwharrie National Forest. That could open unprecedented hiking opportunities in the Piedmont and make Troy a destination for outdoor enthusiasts.

ISLANDS OF HOPE

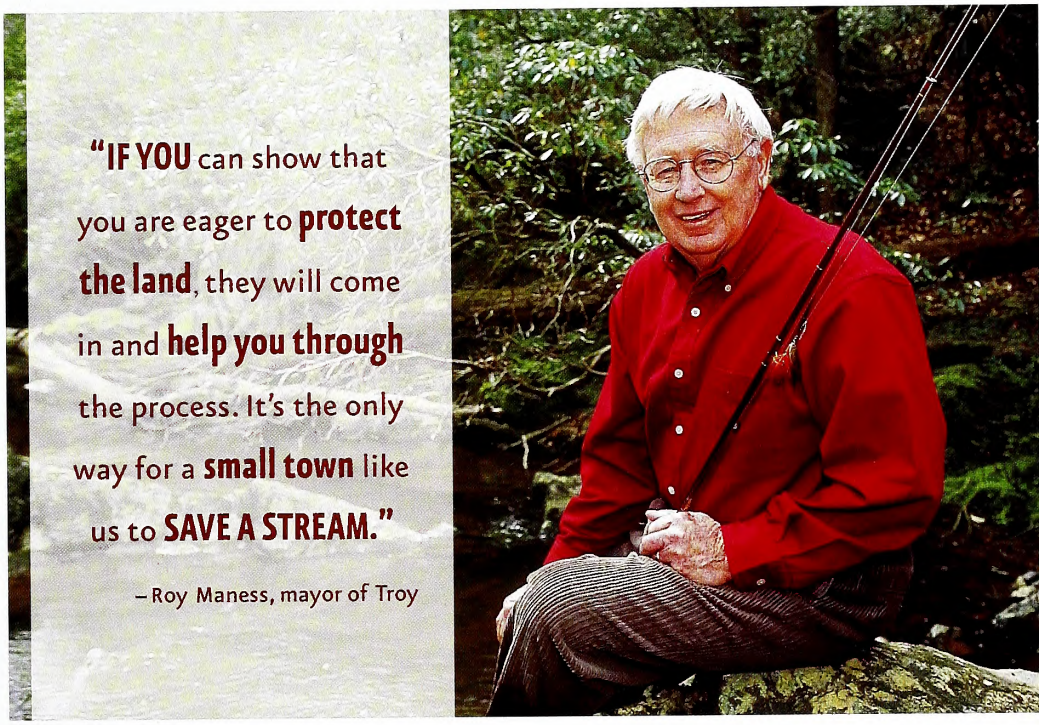
The public may be forgiven for not having heard of the Clean Water Management Trust Fund or for confusing it with other state programs. North Carolina actually has four trust funds—Clean Water Management, Natural Heritage, Parks and Recreation, and Farmland. The mission of each is slightly different, though the end result—protecting key tracts of land—may be the same. CWMTF has garnered the lion's share of funding since its inception and for that Holman credits the political influence of Basnight, who is president pro tem of the senate. The General Assembly allocated significant money to the fund through the lean economic years of 2000–01 and gave it the full statuatory allocation of $100 million for fiscal year 2005–06.

CWMTF is now seen as a crucial vehicle not just to preserve water quality but also to help the state reach its goal of preserving 1 million additional acres of protected open space (the Million Acre Initiative) by the year 2009. "The initial goal of the fund was clean water, but it's grown to encompass so much more than that," Basnight says.

Holman is enthusiastic about recent developments that may allow CWMTF to preserve some huge tracts of land. International Paper Company has announced that it intends to sell approximately 218,000 acres across the Southeast. CWMTF is considering involvement in the purchase of 77,000 of those acres in the Green Swamp and along the Chowan, Upper Tar and Roanoke rivers. "This is an opportunity for conservation on a landscape scale," he says.

Generations from now, birdwatchers, hikers, hunters and anglers will roam lands in North Carolina that would long ago have been converted to subdivisions had it not been for the Clean Water Management Trust Fund. And maybe by then people will recognize its name.

John Manuel is a regular contributor to WINC. *His memoir, "The Canoeist," was just published by Jefferson Press.*



MELISSA McGAW

TOP FIVE CWMTF-FUNDED GAME LAND PROJECTS 1997-2005 (BY GRANT AMOUNT)

YEAR	TRACT	REGION	ACRES	$M
2003	MINGO/JOES CREEK	PIEDMONT	5,621	13.5
2002	NEEDMORE/LITTLE TENNESSEE RIVER	MOUNTAIN	4,468	6.66
1997	ROLLINS TRACT/ FIRST BROAD RIVER	MOUNTAIN	17,829	4.20
1998	LAKE LOGAN	MOUNTAIN	4,374	3.80
2001	CHOWAN RIVER (19 TRACTS)	COASTAL PLAIN	6,466	3.00

TICKED OFF

She's been waiting three months for this moment. Days ago she crawled out of the grassy litter at the edge of the clear-cut and set out for the margin of a nearby deer trail. Perched atop a grass stem along that trail, with her hooked front legs raised to the sky, she has blindly waited day after day for the signs that drive her existence—a warming presence and a whiff of carbon dioxide—and here they are!

A large, warm form passes swiftly, giving her only one chance. She nabs the creature with her front legs and rapidly crawls upward, seeking a secluded spot in which to settle down for the meal she's waited for so long. Upward and upward she journeys, until I feel her crawling on my neck, reach back and snatch her off my skin. I ascertain her species and then quickly dispatch her with a small rock.

PATIENT, EFFICIENT AND OCCASIONALLY DEADLY, TICKS ARE COMMON PARASITES ALL ACROSS NORTH CAROLINA. THEY DO NOT, HOWEVER, HAVE TO RUIN YOUR TIME OUTDOORS.

No animal is more patient than a tick. An individual might perch, motionless, on a grass blade for days at a time in its questing posture (forelegs extended like grappling hooks), waiting for a host animal to walk by. It might spend an entire summer waiting, and then, when cold weather arrives, retreat to the sanctuary of leaf litter to wait out the winter, only to emerge the following spring to wait again. A tick species found in the western United States, the pajarello, may hold the world record among all animals for patience between meals; at least one individual lived for 17 years waiting for its next dinner of deer blood.

Is there anything in this world more despised than a tick? A silent, sneaking stalker, it crawls onto your person, slips unnoticed usually to an embarrassing location in the nether regions of your topography, and inserts its nasty little barbed mouthparts into your skin. Then, over the course of a few days to a week or so, it tanks up on *your* lifeblood. In the process, it may transmit to you some unpleasant baggage it picked up from its last meal, or perhaps from its mother. With such a nefarious lifestyle, do ticks have anything redeeming about them?

WRITTEN BY CLYDE E. SORENSON
ILLUSTRATED BY JIM BROWN

An American dog tick waits patiently on vegetation for a host.

JIM OCCI, WWW.INSECTIMAGES.ORG

Frankly, I have a hard time finding anything positive to say about ticks and what they do to us and other animals, but one certainly has to admire how supremely well adapted they are to their way of life. Ticks are the quintessential parasites. A perfect parasite finds its host efficiently, gets what it needs quickly from that host and does little damage to the host in the process (there is little payoff in killing your host). This perfectly describes ticks, except that they sometimes "accidentally" transmit life-threatening diseases along the way.

Ticks are actually big mites, closely related to the chiggers that bedevil blackberry pickers, the spider mites infesting your sweet corn patch and the little follicle mites inhabiting the eyelashes and eyebrows of most people on the planet. There are about 800 or 900 species of ticks in the world, but only a handful of species are found in North Carolina. Like many other parasites, the majority of ticks are pretty tightly tied to just a few hosts. Since most ticks mate while on a host, specificity helps ensure that the sexes get together, and specificity also makes the nutritional quality of the resources the tick draws from its host more predictable. A few of our tick species specialize on birds or reptiles, but four regularly feed on mammals, including humans. Three of these can transmit disease to people.

AMERICAN DOG TICK

The American dog tick, *Dermacentor rarabilis*, is the largest common tick in North Carolina. The adult females, unengorged, are about 3/16 inch long, mottled in gray and brown; males are slightly smaller and also mottled. Engorged, females can exceed ½ inch in length and resemble a gray wad of used chewing gum with tiny legs.

American dog ticks are three-host ticks. The six-legged larva hatches from the egg and seeks a deer mouse or vole. After a mouse blood meal, it molts into the eight-legged nymphal stage and sets its sights on a raccoon or opossum. It then molts into the adult stage and waits for a dog or a human. Only the adult female typically bites people; males just board hosts to look for willing females and usually don't feed. Adult females can go more than 30 months without feeding. Once a female engorges and mates, she drops off the host, lays a mass of several hundred to thousands of eggs, and dies.

One morning in June 1986, I woke with a fever and a crushing headache—the worst I've ever experienced. I had been in the field just about every day for weeks, and several ticks had penetrated my hide. I was pretty sure I knew what was wrong. My fiancée took me to the university infirmary, where the staff drew blood samples and started me on antibiotics immediately. The headache and fever soon abated. Several days later my lab work came back positive for Rocky Mountain spotted fever.

Rocky Mountain spotted fever is caused by a bacterial organism called a rickettsia, transmitted in North Carolina primarily by the American dog tick. The disease was first described in the Rocky Mountains, but year in and year out, North Carolina leads the nation in reported cases. Most years between 100 and 300 people in the state contract it, making it our most common tick-borne illness. The symptoms of spotted fever include the headache and fever I experienced, but might also extend to vomiting, muscle aches and loss of appetite. These symptoms appear within two weeks of a bite by an infected tick. As the disease progresses, the rash it is named for appears in the form of abundant, tiny red spots, first on the wrists and ankles and then spreading up the extremities. Spotted fever is clearly the most dangerous of our tick-borne diseases. Left untreated, between 10 and 30 percent of those who contract it die. Fortunately, as in my case, spotted fever is easily treated with antibiotics if the illness is caught soon enough.

Ticks in the larval or nymphal stage pick up the disease when they bite an infected animal, but infected females also can pass it to their eggs. Since these ticks are most active, and adults most abundant, in the summer, most cases occur between May and September. American dog ticks are most common in the Piedmont of North Carolina, and so is spotted fever; but one could contract it anywhere in the state.

American dog ticks also occasionally cause a somewhat mysterious illness known as tick paralysis, which, if untreated, can be lethal. Tick paralysis occurs when one suffers a tick bite at the base of the skull, in close proximity to the spinal cord. Apparently components of the tick's saliva interfere with the central nervous system. If the situation progresses far enough, breathing is compromised and the patient suffocates. If the tick is removed, the symptoms generally clear up very rapidly.

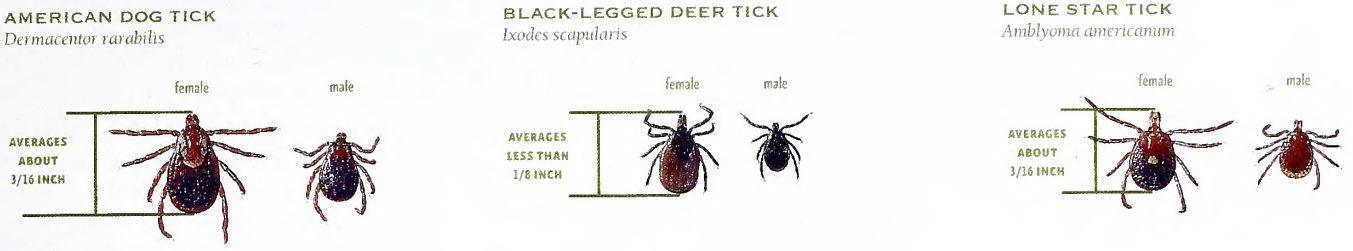
BLACK-LEGGED DEER TICK

The black-legged deer tick, *Ixodes scapularis*, is on the other end of the size spectrum, with unfed females averaging less than ⅛ inch in length. These ticks are a reddish color with, as you might expect, black legs. Like American dog ticks, deer ticks are three-host ticks. The larvae typically feed on lizards, mice or small birds; the nymphs feed on rodents or birds; the adults feed on deer, dogs and people.

Deer ticks are much more likely to be active during the cool parts of the year than

Below: A black-legged deer tick creeps up a pair of jeans in search of a meal. Right: The same species engorged on blood.

LYNETTE SCHIMMING



TICK PHOTOS BY ELIJAH MECK

other ticks; I've picked them up in December and January on mild days. They are, of course, most common where deer and deer mice are abundant. Although they are not uncommon in North Carolina, most of the state's populations appear to be somewhat reluctant to bite people, unlike populations to the north of us.

Deer ticks are infamous as vectors of Lyme disease, a potentially serious infection caused by a bacterial spirochete. Lyme disease is named for the town of Olde Lyme, Conn., where it was first identified in the late 1970s. Lyme disease has become a problem in the northeastern states, around the Great Lakes and in northern California. Although it does occur in North Carolina, the habits of the tick and a generally low incidence of the spirochete in the tick population result in relatively few cases of the disease.

Lyme disease is characterized by fever, muscle aches and, in many sufferers, a "bull's-eye" rash—a bright red spot at the site of the bite surrounded by a ring of clear skin, which is surrounded by a ring of reddened rash. Untreated, Lyme disease can cause arthritis, cardiac damage and neurological injuries that may take years to develop. Like Rocky Mountain spotted fever, though, it is easily treated with antibiotics if detected early.

LONE STAR TICK

After several hours of unsuccessful alligator nest searching, my partner and I staggered out of the swamp near Lake Ellis Simon in Craven County and piled into our work truck. Sweaty, scratched and reeking of swamp mud, we could think of nothing but a shower and a cold beverage. While my co-worker fired up the truck, I slumped in the passenger seat and noticed a tiny brown fleck of "mud" crawling on the leg of my jeans. Then another and another and another followed.

Glancing over at my partner, I noticed a half dozen or more mud flecks wandering about on his shirt. We had apparently hit the mother lode of "seed ticks"—the larval and nymphal stages of the lone star tick, *Amblyoma americanum*. Back at the Forest Service depot, we resorted to duct tape wrapped around our hands, sticky side out, to help corral the teeming hordes of little bloodsuckers. By the time we had "de-tickified" ourselves, we had removed more than 300 of the creatures. I had nightmares all that night about things crawling on me.

Lone star ticks are probably the most abundant ticks in the eastern half of North Carolina. Adult females are mahogany brown with a bright, creamy white spot in the middle of their backs—hence the name. Males lack the spot. Unlike the other species we've discussed, all stages of the lone star are quite eager to feed on humans. If you find tiny attached ticks, they are most likely larval or nymphal lone stars. The immature stages generally have a reddish-brown color. These ticks have proportionately large mouthparts and produce particularly itchy, painful bites. Many people (including yours truly) have a more severe allergic response to the bites of this species than the others.

For many years I was rather cavalier about lone star ticks. I regarded them as little more than an annoyance, since they didn't have a reputation for transmitting disease. However, scientists recently identified a form of Lyme disease, caused by a closely related organism, transmitted by lone stars in North Carolina. They also transmit ehrlichioses, yet another suite of diseases caused by still other bacteria.

SCOTT BAUER, WWW.FORESTRYIMAGES.ORG

DEALING WITH TICKS

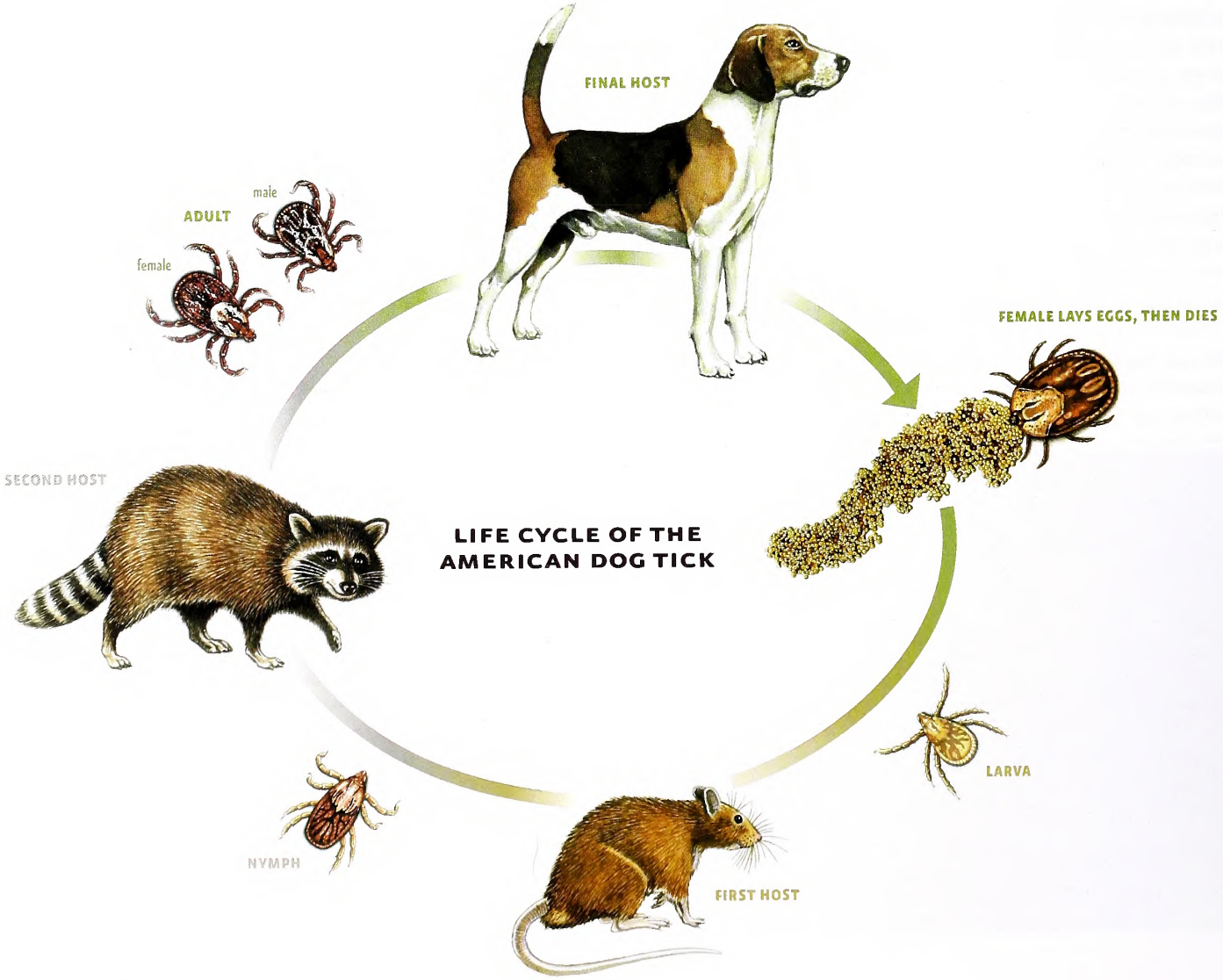
If you participate in virtually any outdoor pursuit in North Carolina, ticks are a fact of life. Although the proportion of individuals in any tick population actually carrying disease organisms is generally low, it is always prudent to regard any tick as a potential disease carrier. It's therefore a very good idea to do as much as possible to protect yourself from these nasty little creatures and the illnesses they carry.

First, recognize tick habitat. Ticks are most abundant in areas that provide good habitat for their normal hosts: rodents, wild carnivores and deer. For North Carolina species, that generally means edge habitat such as field margins, weedy transition areas between woods and pasture, the edges of swamp drainages and often the margins of our home lawns. Our pest ticks are also very susceptible to desiccation, so they need to have good retreat cover handy—a place to hide from drying conditions. This often means leaf litter or dense, grassy vegetation.

Second, dress for ticks. Long sleeves and long pants are always a good idea in tick country. If possible, tuck your pants legs into your boot tops or socks. (Yes, it looks goofy, but it beats a course of antibiotics.) In really ticky areas, duct-taping your pants cuffs and shirt sleeves shut can help ward off the little beggars. If your outdoor activity of choice allows, light-colored clothing makes creeping ticks easier to see. When you return home, remove your clothes promptly and wash them.

Third, use repellents. The first and most effective of the two available is an aerosol clothing treatment containing the chemical permethrin. Permethrin is a synthetic version of the naturally occurring insecticidal pyrethrins found in certain chrysanthemums. Although it is an insecticide, it is extremely offensive to tick sensibilities. I have spent odd moments in the turkey woods, when things are going real slow, watching a tick crawl across the treated knee of my hunting pants; the creature will walk on the very tips of its little legs, trying to stay as far from the chemical as possible. If it doesn't bail out quickly enough (or if I don't flick it into oblivion with a flip of my finger), it may eventually roll over on its back, fold up its legs and die.

Permethrin must be used only as a clothing treatment. If applied to skin, it is rapidly absorbed and deactivated, and it makes some people itch. Applied to clothing, however, it binds tightly to the cotton or woolen fibers, and its repellency may survive six or seven



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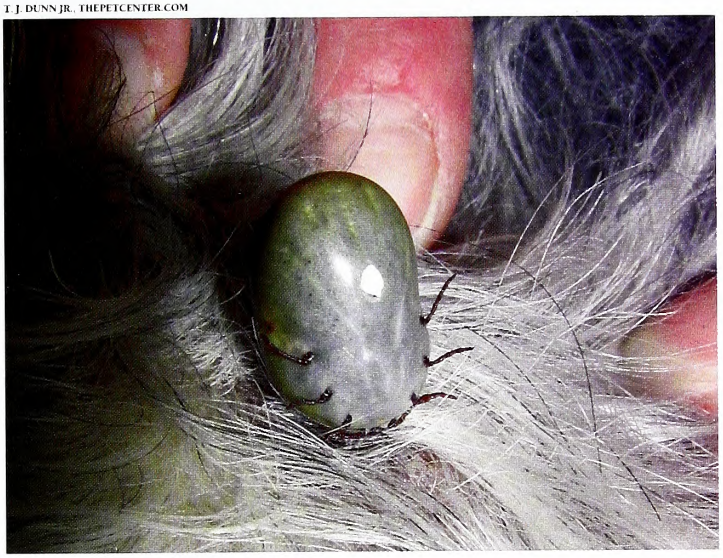
T. J. DUNN JR., THEPETCENTER.COM



Left: The telltale bull's-eye rash is characteristic of Lyme disease. Right: Engorged dog tick feeding on the host for which it is named.

launderings. Several permethrin products are available at outdoor stores or through Internet sporting goods vendors. If we had had permethrin treatment available to us in my old alligator project days, we likely would never have seen those hundred-tick days.

The second kind of repellent is applied to exposed skin. The most effective of those currently on the market contain DEET, the familiar mosquito repellent, and you use it just as you would to keep mosquitoes off.

Fourth, inspect yourself regularly for the sneaky little devils. It takes perhaps several hours for a tick to attach and to start feeding, so if you perform tick inspections every six to 12 hours, it is unlikely that any ticks that break your repellent barrier will have fed long enough to transmit disease agents. Ticks typically settle in places on your person where skin meets skin, where clothing fits tightly (such as at your belt) or at hairlines, so pay particular attention to these regions. Don't forget to check your kids when they've been out, and don't ignore Fido, either.

In spite of everything you do, you may occasionally end up with an attached tick. As long as you remove the critter within five or six hours, there is little chance that it will have had enough time to transmit any pathogens to you, so there is no reason to panic. There is one right way to remove a tick and a host of wrong ways. Don't slather the tick in petroleum jelly, encase it in nail polish, touch a hot match to its rump or soak it in kerosene or any other flammable substance. These strategies will get you either a greasy, shiny, slightly baked and puking tick or a combustible but still-attached tick. Ticks have barbed mouthparts (vaguely like a frog gig), and they also secrete a cement when they attach that basically glues their mouthparts to the host. Trying to encourage them to back out is usually a fruitless enterprise.

The best way to remove one of the critters, therefore, is to gently but firmly grasp the head of the animal with tweezers as close to your skin as possible, and then apply steady, gentle pulling pressure until the mouthparts come out. Don't grasp the tick's body; you don't want to squeeze its gut contents into your skin. In a pinch (pardon me) you can use your fingernails for this exercise, but be mindful that you may contaminate them with tick gut contents. If you can, use a piece of tissue to insulate your fingers from the offender. Should the tick's mouthparts break off during this process, use a knife blade to scrape out the remains. Although you aren't likely to contract disease from a piece left in, the area might get infected. Wash the bite site and your hands when you get done.

DENNIS KUNKEL MICROSCOPY

A close-up of the working end of a dog tick — its barbed mouthparts.

Once you remove the tick, it is an excellent idea to save it in a small bottle of alcohol for at least two weeks. Symptoms of most tick-borne diseases will begin showing within those two weeks. If you do become sick with suspicious symptoms, take the preserved tick with you to the doctor, who can use the identity of the tick to help determine the probable cause of your illness.

Finally, use care when pulling ticks off your pets; you can contract disease from the ticks should you get their stomach contents or secretions in cuts on your hands or inadvertently rub them in your eyes. Latex gloves are good for this chore. Bear in mind, too, that your pets can contract disease from ticks. Keep your pets dosed with a good flea and tick repellent, particularly during the warm months.

Ticks are unloved by practically everyone, and that's not likely to change. But if you understand them and take precautions against them, there is no reason they should keep you from enjoying the outdoors. ◆

Clyde E. Sorenson is an associate professor of entomology at N.C. State University and a regular contributor to WINC.

PIER PRESSURE

WRITTEN BY BILL MORRIS ■ PHOTOGRAPHED BY SCOTT TAYLOR

In the dog days of August 1990, as a stunt for Raleigh's long-gone *Spectator* weekly, I fished on every available pier between Atlantic Beach and the South Carolina state line in a single weekend. I bought a pier pass, walked to the end and cast my lure into the ocean from 23 piers in 48 hours. (Sunset Beach Pier was still closed after Hurricane Hugo damage.)

As the price of beachfront property continues to skyrocket, fishing piers, and the culture they engendered, are becoming endangered monuments to a simpler era.

As of May 1, 2006, 10 of those piers had closed forever and one more in Atlantic Beach may be gone by the time you read this. On the Outer Banks (territory I didn't cover back in '90), the Kitty Hawk Pier has been turned into a Hilton, and Jennette's Pier has been closed since Hurricane Isabel in 2003. Jennette's Pier is owned and operated by the N.C. Aquarium Society in partnership with the N.C. Aquariums. The pier is being rebuilt completely of concrete, much like Johnny Mercer's Pier in Wrightsville Beach, and should reopen by the spring of 2008.

When the first edition of Robert J. Goldstein's "Coastal Fishing in the Carolinas from Surf, Pier, and Jetty" was published in 1986, the author listed 35 ocean piers in North Carolina—more than 25 percent of all the piers on the entire Eastern and Gulf coasts of the United States. We had one more than Florida, but that state has 1,350 miles of coastline compared to our 301.

North Carolinians and out-of-state tourists alike took it for granted that we were the center of pier culture. How fortunate we were to have so many of these sturdy, creosoted Shangri-Las where anyone, regardless of income, hometown or skill level, could spend around $5 for a day's pass and go fishing in the Atlantic Ocean. Most piers don't even require that you own a rod and reel; they will rent you one for less than $10. Parking is generally free, the food is cheap, bait is reasonable and the drinks are cold.

The Sportsman's Pier in Atlantic Beach has joined the list of the dearly departed.

If this makes fishing piers sound like some kind of paradise, well, they always have been, ever since the Kure Beach Pier opened in 1923. It was a tenuous, 300-foot addition to the Kure family's then-remote entertainment enclave—a pavilion-bathhouse-restaurant complex that catered to Roaring '20s Wilmington. And it immediately caught on.

Since then generations of North Carolinians have thronged to piers. Often we've had something other than fishing on our minds. As teenagers, how many of us found vacation salvation at the pier house arcade? How many summer romances—or even lifelong marriages—began with something as mundane and magical as a nighttime stroll to the end of a fishing pier?

Despite their diminishing numbers, piers still cast their spell. So, almost 16 years after my 48-hour marathon, I wanted to find out why so many have disappeared and what the future may hold for the rest.

Access denied

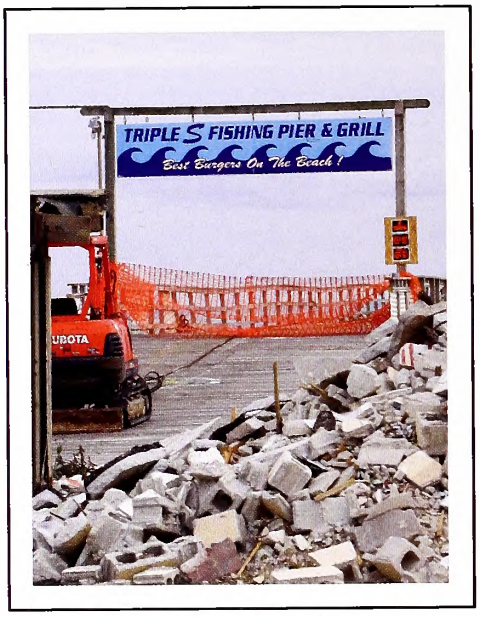
"It's a shame," says Mike Robertson, owner of the Kure Beach Pier and grandson of the man who started it all, L.C. Kure. "Kure Beach has always been very open-armed to people from all walks of life, not just the elites and the affluent. It seems like [the new] people have got a problem with lower- and middle-income folks. The lower guys get priced out."

The Kure Beach Pier is truly a landmark, having survived more than a dozen hurricanes. It may well have been the first fishing pier on the East Coast and has been under the same family's ownership for 83 years. Robertson says he intends to keep it that way. Still, he says that he doesn't blame anyone for selling a pier. "When you are in business," he says, "it can't just stay the way it is."

According to Frank Tursi, Cape Lookout coastkeeper for the North Carolina Coastal Federation, "Piers are becoming like quaint historical oddities. The gentrification of the coast continues at a rapid pace, and with the piers we're losing cultural icons and access to the beach."

In short, accelerated development on our barrier islands is doing what 80 years of hurricanes and nor'easters could not: closing down most of our fishing piers for good. But Tursi doesn't condemn the pier owners who don't rebuild after a storm, or who sell a perfectly good pier because it doesn't make financial sense to keep operating it. "The land," he says, "is too valuable."

Nowhere is the number of piers dropping more rapidly than along Bogue Banks. The Emerald Isle, Iron Steamer and Indian Beach piers are gone. The Morehead Ocean Pier was torn down and then rebuilt behind the massive Sheraton Hotel as more of a guest amenity than a public fishing pier. It was heavily damaged in last September's Hurricane Ophelia. The site of Sportsman's Pier in Atlantic Beach has already been rezoned for residential use and approved for a 10-unit condo complex, according to the *Carteret County News-Times*. The Triple S has also been rezoned, sold and demolished.



The Bogue Inlet Pier is the latest plank palace to be sold, but owner Mike Stanley told *The News & Observer* of Raleigh in April that he was about 85 percent certain the new owners would keep the pier open. "That's my wish, and that's the town's wish. If the right planning is done, this should be pretty positive," Stanley says.

The pier had been in Stanley's family since his late father, Joe, and uncle, Melvin Stanley, bought it in 1972. "I graduated from high school that year [in Philadelphia], and the next day I came down here," Stanley says. "Running this pier has been a way of life." But it's not necessarily a way of life that makes good business sense. "Putting a million dollars' worth of lumber into the ocean may not be the smartest thing to do. We're the biggest gamblers this side of Las Vegas."

Stanley believes that piers play an important role in preserving not only the culture but also the environment of our barrier islands. "We have a relatively light footprint," he said. "Piers have a minimal impact on the environment because we funnel large numbers of people onto a single access point. It's a valuable service, and we need to continue it." He even suggests that beach towns ought to consider buying the piers and leasing them to operators.

Saltwater fishing 101

About a hundred miles up the coast, at the Outer Banks Fishing Pier in Nags Head, owner Garry Oliver agrees that all pier owners are struggling. Oliver, who has owned the pier since 1970, says he has seen all sorts of strange behavior, with top honors for weirdness going to a group of shark fishermen he had to dissuade from using live chickens as bait. What he sees for the future of fishing piers is uncertainty. "It's totally changed," he says, referring to Nags Head as well as his business. "We used to be busy 24 hours a day, summer and fall. Our customers were lower- and middle-class people who would get a cheap motel room or sleep in their trucks or stay up all night fishing."

Oliver points out that the piers have long performed an important function that is often overlooked. "We introduce people to saltwater fishing," he says. "That's something we've always done that's benefited the economy of the community and the fishing industry in general."

Kure Beach Pier's Robertson brought up the same point. "It's not just about making money. We [each] affect 20,000 to 25,000 people a year. Pier owners have an obligation and responsibility to educate people about conservation. I tell them, 'If you're not gonna eat it, don't kill it.'"

Are education, enjoyment and access being lost along with the piers? Not too long ago there were eight ocean piers on Topsail Island, plus the popular Topsail Sound Pier. Today there are three. "It used to be packed every weekend, with 200 or 300 people on every pier," says Hampstead native and former fish-house owner L. D. Smith. In the mid-1980s Smith leased North Topsail's Paradise Pier, which was lost to a pierhouse kitchen grease fire in 1985.

Storms are usually the engines of a pier's destruction. At Barnacle Bill's Pier in Surf City, Hurricane Bertha took 75 feet off the end in July 1996. Owner Doug Medlin immediately went to work making repairs. "We finished about five days before Fran," he says. Fran, a September storm, was a full-scale disaster for Topsail, and Medlin never

HOW FORTUNATE WE WERE TO HAVE SO MANY OF THESE STURDY, CREOSOTED SHANGRI-LAS WHERE ANYONE, REGARDLESS OF INCOME, HOMETOWN OR SKILL LEVEL, COULD SPEND AROUND $5 FOR A DAY'S PASS AND GO FISHING IN THE ATLANTIC OCEAN.

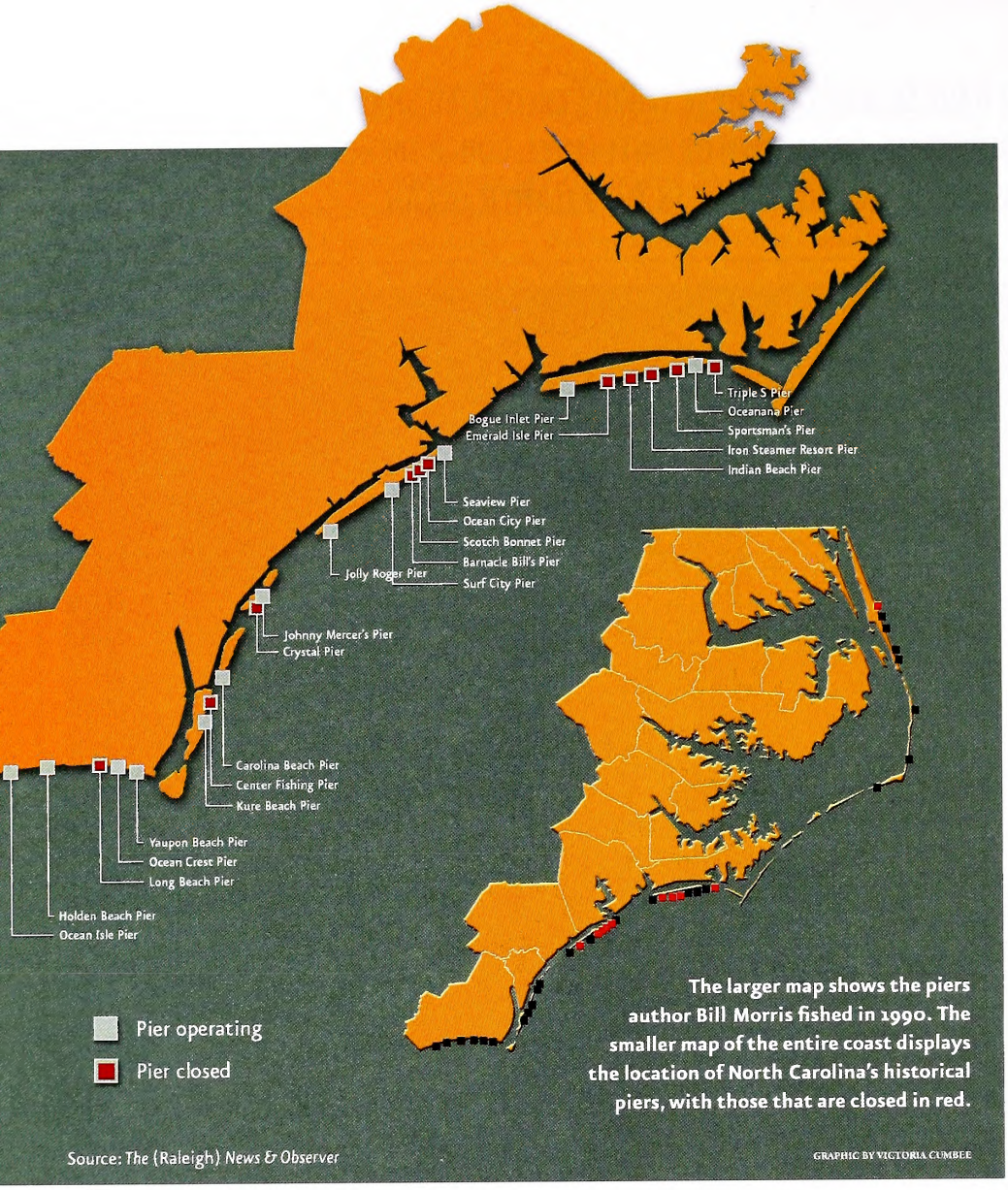
re-opened Barnacle Bill's, which had been in business since 1959. The Scotch Bonnet, Ocean City and Topsail Sound piers also were casualties.

Yet despite 3 feet of sand in the streets and even cottages washed into the sound, soon after Fran real estate prices on Topsail began to climb. Lately they have taken off again, and former pier operator and commercial fisherman Smith is now a real estate agent. He says that the 10 oceanfront lots that were carved from the Barnacle Bill's property sold for at least $800,000 each.

When I fished it during my pier marathon back in 1990, Barnacle Bill's looked as if little had changed since it was first built. My 15-year-old notes tell a typical tale. "7:20 a.m. A kid catches a nice sea mullet. His whole family is out here fishing right in the surf wash, with Thermos bottles of coffee, etc."

At 5:15 that same afternoon, seven piers later, I was on Oak Island at the Long Beach Pier, the self-proclaimed "longest in North Carolina." There I met a man whose pier cart identified him as the "Pier Master." He

For decades, anglers have found not only fish, but solace at North Carolina piers. In addition to providing cheap pleasure, these plank palaces introduced thousands to saltwater fishing. Of the 23 piers author Bill Morris fished in 1990, 11 have closed or soon will be closed, many to make way for beachfront housing.



The larger map shows the piers author Bill Morris fished in 1990. The smaller map of the entire coast displays the location of North Carolina's historical piers, with those that are closed in red.

was an older gentleman dedicated to king mackerel fishing as far offshore as his modified golf cart could carry him — all 1,047 feet. The cart would hold six rods, coolers, a bait bucket and other paraphernalia.

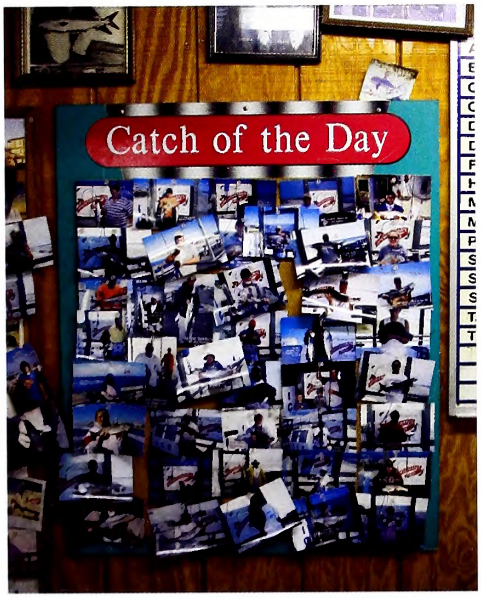
A special breed

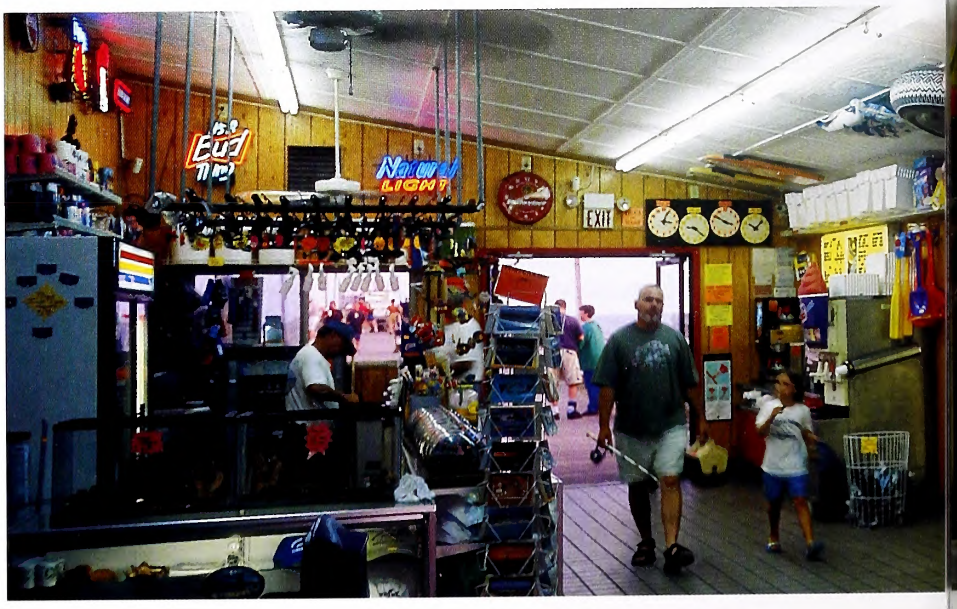
I wonder if the Pier Master was there when the Long Beach Pier closed for good with a big New Year's party on Jan. 1, 2006. According to an Associated Press report published two days later, "Pier owner Tommy Thomes had to divide assets with his former wife for a divorce settlement. The pier property will be divided into 10 lots worth as much as $1 million each."

No one I interviewed blames pier owners for not rebuilding after a storm. Yet for more than 70 years, piers were routinely restored to operation after hurricanes and no-name storms. According to Robertson, the Kure Beach Pier has had signficant storm damage at least 19 times.

Sitting in his pier house on a blustery day in Nags Head, Oliver tells a story that illustrates how pier ownership is not for the faint of heart. Shipwrecks are a big part of the lore in Dare County, but to pier owners they're more than just colorful relics. Buried wrecks with stout timbers made from oak or cypress are often uncovered in a big storm. Afloat again, these ghost ships can act as battering rams against a fishing pier.

During a major nor'easter in 1978, Oliver got a call that floating wreckage had just gone through Jennette's Pier, tearing out a major section of pilings. And the wreck was headed his way. "I got some guys together and some grappling hooks on heavy lines. We went out on the north side of the pier to watch for the





Piers such as the Sportsman's (left) and Bogue Banks Inlet have provided places to show off a big fish and keep track of who has had the best catches for the year. And a fisherman could buy just about everything he needed for the day right there in the pier house.

wreck, thinking we could go down on the beach, and if we could snag it, drag it to shore before it got to us." As strange as it sounds, this technique had worked before.

Oliver and crew stood in the howling storm. It got darker and blew harder. "At 11 o'clock I called it quits and went home. The next morning I got a call. Someone had seen that same wreck, washed ashore at Coquina Beach. Somehow it floated through Jennette's and then around my pier and came back in to the beach south of here." Today that wreck is on display in front of the Nags Head town hall. She has been identified as the *Francis E. Waters*, a schooner lost in 1889.

The people who still choose to own piers are a special breed. Oliver grew up a self-described "pier rat." Just to maintain the Outer Banks Fishing Pier parking lot requires about 50 truckloads of sand every year. His most recent in a string of rebuilding efforts came after Isabel took 150 feet of the pier in September 2003. Robertson is following in his grandfather's and father's footsteps in Kure Beach. After Bertha he had to start practically from scratch one more time. Stanley rebuilt the Bogue Inlet Pier after Fran took away more than 400 feet. When Ophelia damaged the Sheraton Pier last September, some of the debris washed into his pilings. In January I visited with Mike while he and his crew were making repairs in a toe-numbing gale. Down at Topsail Beach, Robin Orr still runs the Jolly Roger, originally the New Topsail Ocean Pier, built by his late father, Lewis, in 1954 (just in time for Hazel). The Orrs decided to rebuild after Fran.

Maybe these pier owners should be considered as much preservationists as businessmen. Thanks to their commitment, the fishing piers we have left have remained accessible, inexpensive and still popular. Just as they always have, the same fishermen return year after year to celebrate traditions that started decades ago.

A society of anglers

"It's like a social situation, out on the pier," says Angelo DePaola, who has fished nearly every day of every season on the Jolly Roger since 1957. He may very well be the most accomplished pier fisherman in North Carolina, if not the world. "A while ago my aim was to catch 500 king mackerel off that pier," he says. "Twenty years ago I got to 400."

He's now at 480. And don't think it's a fish story—he has recorded every catch. In the closet of the spare bedroom of his modest, landlocked Topsail Beach home, DePaola has a thick stack of records kept by the Silver Kings, the Jolly Roger's now-defunct fishing club. Known to his friends as "Depe," he started fishing seriously after retiring from the Marine Corps and becoming civilian fire chief at Camp Lejeune.

"When I got off work, I'd drive down from Jacksonville and fish. Early on I decided I'd get serious and fish only for the game fish: drum, amberjack, tarpon and the king mackerel. In those days we caught more tarpon than kings, and the main thing we caught was red drum—30-, 40-, 50-pounders. In good times, I once caught five kings in one day." In 1979 DePaola and his wife, Janie, moved practically across the road from the Jolly Roger. "One of my buddies said, 'What are you gonna do? You can't fish all the time.' I told him, 'You watch me.'"

Even winter doesn't stop him. "We've been having a good run of trout lately," he says in a phone interview a week after Thanksgiving, which in 2005 happened to fall on his 85th birthday. DePaola is as rooted to the community of pier fishing as anyone could possibly be. Years ago, at the end of the Jolly Roger, he told me a story that gave a glimpse into why, for nearly 50 years, he has taken fishing to such a single-minded level. The story began with his platoon of Marines being attacked on a hill somewhere in Italy, and it ended with his being one of the very few brought off that hill alive.

It troubles him to see the piers just up the road in Surf City become cottages. "The piers might be on their way out," he says. "They can get a helluva lot of money for that land." But doesn't the real estate boom benefit him, too? "They say the land value has tripled here since last January. Somebody could offer me a million dollars. But where the hell else would I live?"

Fishing on 23 piers in 48 hours began as a lark, but 16 years later the fate of these rustic, resilient bridges to nowhere has become something of an obsession. I'm fascinated by the trivial, like the way that, laid end to end, the 10 piers that are already gone would stretch for almost 2 miles of warped planks, knotholes, fish scales, chili-dog juice and notches carved into nearly every foot of the rail. And for every set of notches there's a family like the one on Barnacle Bill's, pulling in spots and sea mullet, the children laughing as they fill up coolers and buckets while their mother smiles under her bonnet and Dad baits hooks. "Fishermen," Stanley says, "are from all walks of life."

With fewer piers every year, how long will that remain true?

"PUTTING A MILLION DOLLARS' WORTH OF LUMBER INTO THE OCEAN MAY NOT BE THE SMARTEST THING TO DO. WE'RE THE BIGGEST GAMBLERS THIS SIDE OF LAS VEGAS." —MIKE STANLEY

Bill Morris, author of the novel "Saltwater Cowboys," lives in Beaufort.

Shooting STRAIGHT

BRIAN JOY

When asked to help judge the 2005 *Wildlife in North Carolina* Photo Competition, I had to think about what makes a memorable image. I have taken nature photographs most of my life, and I know what I like in my own pictures. But I realized that a picture I take has a lot of meaning to me that may not be apparent to others looking at my work. Now I had a chance to review thousands of images by other photographers, but without the context of being there when they snapped the pictures. So what was it that caught my eye and made me look twice?

It wasn't the location of the shot. Great nature pictures can be taken anywhere—a tree in the city, your backyard, a local park or vacation spot. The key is being able to see nature wherever you are. Nature photography is a fun way to record your experiences, share them with others, and be creative. It can be a wonderful lifelong hobby or profession and is a valuable tool for conservation education.

It wasn't the type of camera and lens used to make the photo. Although digital cameras have made it easier for photographers to learn from mistakes because the image is immediately available, film is still the favorite of many seasoned photographers. New technology is constantly changing the camera world, so choose a camera based on your needs and budget. Whether you use a digital or film camera, you improve by getting out and taking pictures.

We live in a truly beautiful state with incredible natural diversity. Combine dramatic subjects with appealing light, be sure to have your subject in focus and you will be taking your own great wildlife photos. Here are a few things I've learned from decades of taking pictures and many hours of viewing competition entries.

1 | **KNOW YOUR CAMERA.** Read the manual. Learn what the controls do and where they are so you can find things quickly. Ask someone who is more experienced to offer advice. And always remember to take along extra batteries and memory cards or film.

2 | **KNOW YOUR SUBJECT.** If you want to take pictures of a particular plant or animal, learn as much as you can about its habitat and behavior so you can better predict when and where to find it.

Both new and experienced nature photographers can use these tips and techniques to add a new level of interest to their wildlife pictures.

Written by MIKE DUNN

CHIP LAUGHTON

Good techniques: a unique view of Looking Glass Falls, good afternoon lighting on Tesha the pointer, and a good low angle on this Roanoke Island lady's slipper.

3 | FRAME IT. Don't always put your subject in the center of the picture. Photographers know the rule of thirds: Imagine a tic-tac-toe board in your viewfinder. Try to place the subject where the lines intersect, and you usually end up with a more pleasing composition. Also, remember to turn your camera for vertical pictures when it seems appropriate.

4 | GET FOCUSED. The No. 1 mistake for beginners is a blurry subject. Be sure your main point of interest (the animal, the plant or whatever you want the viewer to notice) is in focus. When photographing an animal, make sure you have its eyes in sharp focus.

5 | GET THE LIGHT RIGHT. The best hours for photography are often early and late in the day, when the sun is at a lower angle and the light is less harsh. Try to keep the sun at your back to reduce hard shadows. Your flash can fill in shadows on bright days. Slightly overcast days offer good lighting for photography.

6 | DO A BACKGROUND CHECK. Look beyond your main subject to make sure the background is not distracting. A tree trunk in the wrong place may look like it is growing out of an animal's head! You can blur the background by using a shallow depth of field (the area in focus): Set your lens at a lower f-stop or back away from your subject and zoom in.

7 | PERFORM MACRO MAGIC. Get close to your subject and fill the frame. Macrophotography is a great way to discover details of nature that may be overlooked. Many digital cameras have great macro capabilities. You'll be amazed at what the camera can show you that you might otherwise never see.

8 | GET DOWN. Look at your subject from different angles. Instead of always standing to take pictures, kneel or even lie down to frame the image. Take along a plastic garbage bag to protect you and your camera from dirt and mud.

9 | ROCK STEADY. Use a tripod or a high shutter speed to keep your camera still and reduce your inventory of fuzzy images. Or brace the camera or yourself against a rock, tree or other solid object to steady your shot.

10 | NIGHT TIME CAN BE THE RIGHT TIME. Visit your yard at night and search for interesting subjects by flashlight. Small critters such as caterpillars and toads show up in the beam of a flashlight. Some animals will come out only after dark.

11 | BUILD IT AND THEY WILL COME. Create wildlife habitat by planting native plants that provide food and cover. Install a water garden or put up bird feeders, and you can take wildlife and plant pictures year-round right outside your door.

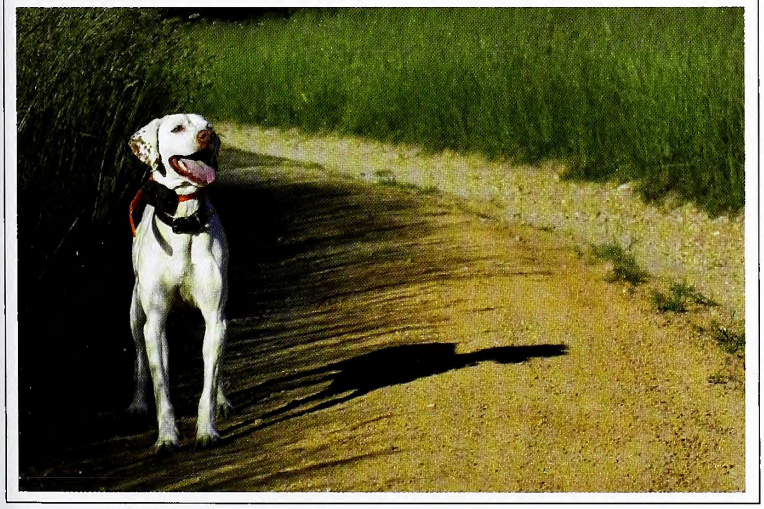
12 | BREAK THE RULES. Sometimes the most dramatic, eye-catching images are those that break the rules. Do something different—an unusual angle, a blurred image to highlight motion, an extreme close-up—and it may turn out to be the best picture of the day.

13 | HIDE BUT DON'T HARASS. Try a portable photo or hunting blind to get close to shy birds and mammals. Learn to be patient and quiet. Wait and watch, and wildlife may come closer. But don't get too close to some animals. For your safety and theirs, never harass wildlife.

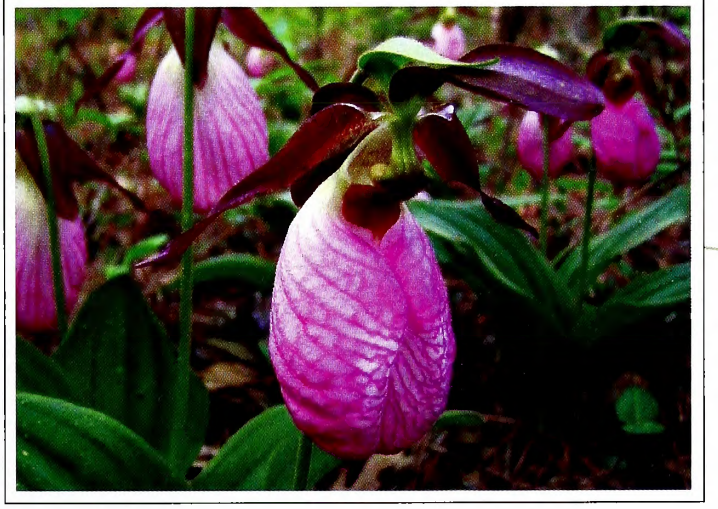
14 | JUST DO IT! The best advice is to pick up a camera and start shooting, and shoot a lot. The more photos you take, the better you'll get. ◆

Mike Dunn is coordinator of teacher education at the N.C. Museum of Natural Sciences. He served as a judge in the 2005 photo competition.

CHIP LAUGHTON



JEFF LEWIS



WILDLIFE IN NORTH CAROLINA

2006 PHOTO COMPETITION

JEFF LEWIS

Jeff Lewis of Manteo captured this Carolina anole for last year's *Wildlife in North Carolina* Photo Competition. The sharp focus on this extreme close-up impressed the judges.

Beautiful images of the natural wonders of North Carolina have inspired generations of people to be better stewards of our precious natural resources. The *Wildlife in North Carolina* Photo Competition aims to encourage today's wildlife photographers and to foster greater appreciation of North Carolina's wildlife and natural resources.

Excellent wildlife photography has been the cornerstone of *Wildlife in North Carolina* magazine and of exhibits at the N.C. Museum of Natural Sciences for many decades.

Winning photographs will be published in the January 2007 issue of *Wildlife in North Carolina* and will be exhibited at the N.C. Museum of Natural Sciences in Raleigh and at other science museums and wildlife centers across the state in 2007.

WHO MAY ENTER

Amateur and professional photographers, except for N.C. Wildlife Resources Commission and N.C. Museum of Natural Sciences employees and their immediate families (children, siblings and spouses).

WHAT TO ENTER

Photos will be judged in 10 categories:

Birds

Mammals

Reptiles and Amphibians

Invertebrates

Peaks, Valleys and Plains: Our landscape category.

Wild Plants: Wild-growing plants only, including their flowers, leaves, fruits and other parts. Absolutely no cultivated plants will be accepted.

Outdoor Recreation: Show how people interact with North Carolina's natural world, from hunting and hiking to fly-fishing and free climbing to canoeing and shell-collecting. Please confine entries to activities that are inextricably linked to nature. Events such as beach weddings and team sports, although held outside, are not in keeping with the spirit of this category and are not eligible.

Animal Behavior: Anything animals do, from everyday activities to interactions with other animals to unusual behavior.

Youth Photographer, 13–17: Any of the above subjects, shot by photographers under 18.

Youth Photographer, 12 and under: Any category, shot by children 12 and younger.

- Photographs must have been taken in North Carolina within the last five years—no earlier than Sept. 15, 2001.

- You must declare on your entry form if your photograph is of an animal in captivity, such as at a zoo, nature center or rehabilitation facility. Please do not enter photos of animals that are both captive and non-native to North Carolina (for example, polar bears or lions at the N.C. Zoo). No pets or domestic animals will be accepted, with the exception of animals participating with people in outdoor recreation (for example, hunting dogs or riders on horseback). Please do not harass wildlife in an attempt to photograph it.

- Manipulation of images, either film or digital, should be limited to conventional darkroom techniques or basic sharpening and cropping. Images should contain only the subject matter as originally seen through the viewfinder. Double exposures, digitally stitched photos and images containing any manipulated or added content should not be entered and will not be accepted.

- An entrant must hold all rights to a photograph. Photos previously published or pending publication, or that violate or infringe upon another person's copyright, are not eligible. Please do not infringe on the rights of property owners in an attempt to photograph animals.

HOW TO ENTER

Visit www.ncwildlife.org, click on the Photo Competition link and then click on the Enter a Photo link to submit a photograph. Only JPG files will be accepted. Upload your photo using the online entry form on the Web site. Repeat this process for each photo entered. Entrants may submit a maximum of three (3) photos per category.

Entries must be uploaded by 5 p.m. on Friday, Sept. 15, 2006. Entrants may verify receipt of entries by checking www.ncwildlife.org and clicking on the Photo Competition link to view a list of all entries.

Entrants in the youth categories must be the appropriate age for the category entered on the closing date of the competition.

PRIZES

All winners will be published in the January 2007 issue of *Wildlife in North Carolina* magazine and exhibited at the N.C. Museum of Natural Sciences in Raleigh. Winners will also receive a print of their winning entry and products from our sponsors.

- Grand prize: Your photo published on the cover of the January 2007 issue of *Wildlife in North Carolina* magazine, plus $200.
- First place, all categories: $100.
- Second place, all categories: $75.
- Third place, all categories: $50.

JUDGES

Winners will be selected by a panel comprised of staff of the N.C. Wildlife Resources Commission, N.C. Museum of Natural Sciences, *The News and Observer* of Raleigh, UNC-CH School of Journalism and professional wildlife photographers.

THE FINE PRINT

By entering the 2006 *Wildlife in North Carolina* Photo Competition, entrants grant *Wildlife in North Carolina* magazine the right to publish and use submitted photographs in print or electronic form to promote the competition. Reproduction of entries will include photographer credit.

Entrants agree that if their submission is selected as a winner, they grant the N.C. Museum of Natural Sciences the right to display their photograph(s) at the museum's Raleigh location and at other venues in North Carolina. Exhibition of entries will include photographer credit. Winners also grant the museum the right to publish photos in its magazine, *North Carolina Naturalist*.

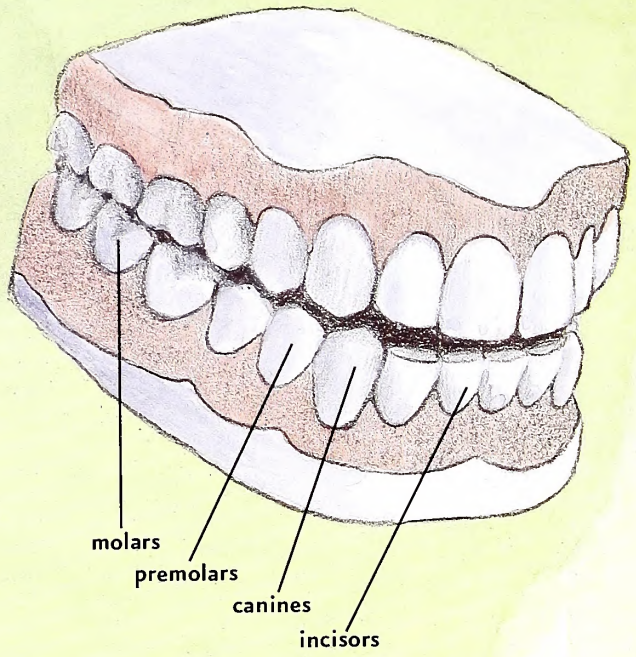
Winners will be required to provide original source material—slides, digital files or negatives—for reproduction in the magazine and for exhibition prints. Original digital files of winning photos must be accompanied by a color print of at least 4x6 inches.

Wildlife in North Carolina staff will determine entry eligibility.

Please do not call about the status of entries. Send questions to competition@ncwildlife.org.

Enter online at www.ncwildlife.org.

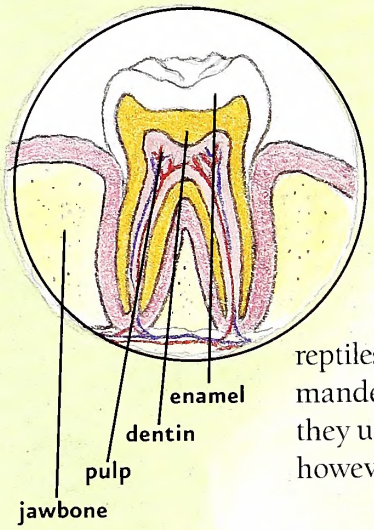
ALEX MCIVER



You use them to slice into an apple and then chew the pulp to swallow. But you are not the only mammal with

Terrific Teeth

written by Roger A. Powell / illustrated by Helen Correll
nature activity by Anne M. Runyon

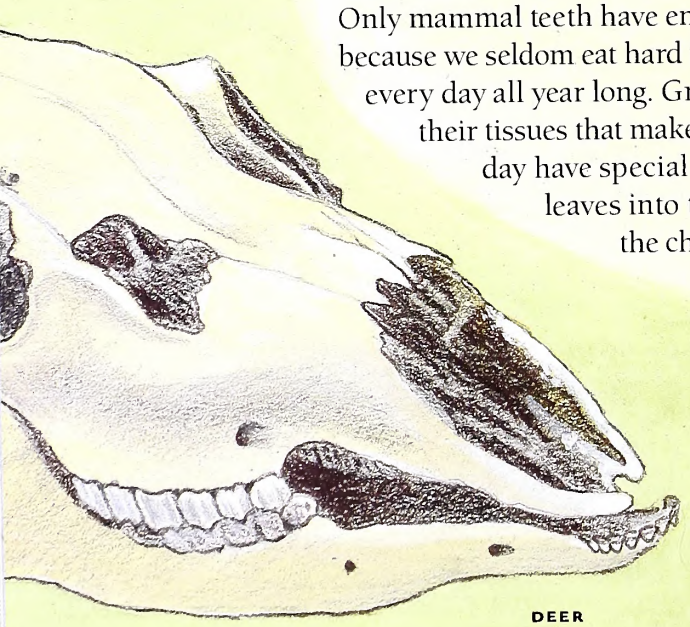


Our teeth are pretty special. Human teeth are extremely hard, allowing us to chew diverse foods. Enamel, the outside layer, is the hardest material made by any animal. Yet, despite being very hard, teeth are alive. You know that because you can get a toothache when a tooth is sick. Inside the enamel is dentin, a substance not so hard as enamel, and protected inside the dentin is the pulp, where blood vessels and nerves hide. Cementum on the outsides of tooth roots secures teeth into the bones of your jaw.

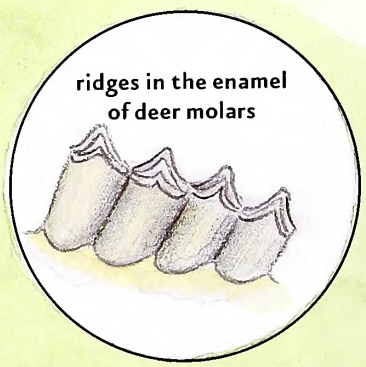
Humans are not the only animals with teeth. Almost all mammals, reptiles and fish have teeth, many dinosaurs had teeth, and even frogs and salamanders have little nubbins of teeth. Baby birds have an egg tooth, which they use to cut themselves from their eggs when they hatch. Mammal teeth, however, differ from the teeth of these other animals.

TOUGH TO BE A TOOTH

Only mammal teeth have enamel, but people don't put our enamel to a real test because we seldom eat hard foods. Wild herbivores, in contrast, eat abrasive foods every day all year long. Grasses, for example, have microscopic bits of silica in their tissues that make them extremely rough. Teeth that chew plants every day have special ridges in their enamel that slice and grind grass and leaves into tiny bits. But those plants actually wear enamel off the chewing surfaces of teeth. Consequently, teeth that chew leaves and grasses keep growing longer than human teeth do.



DEER



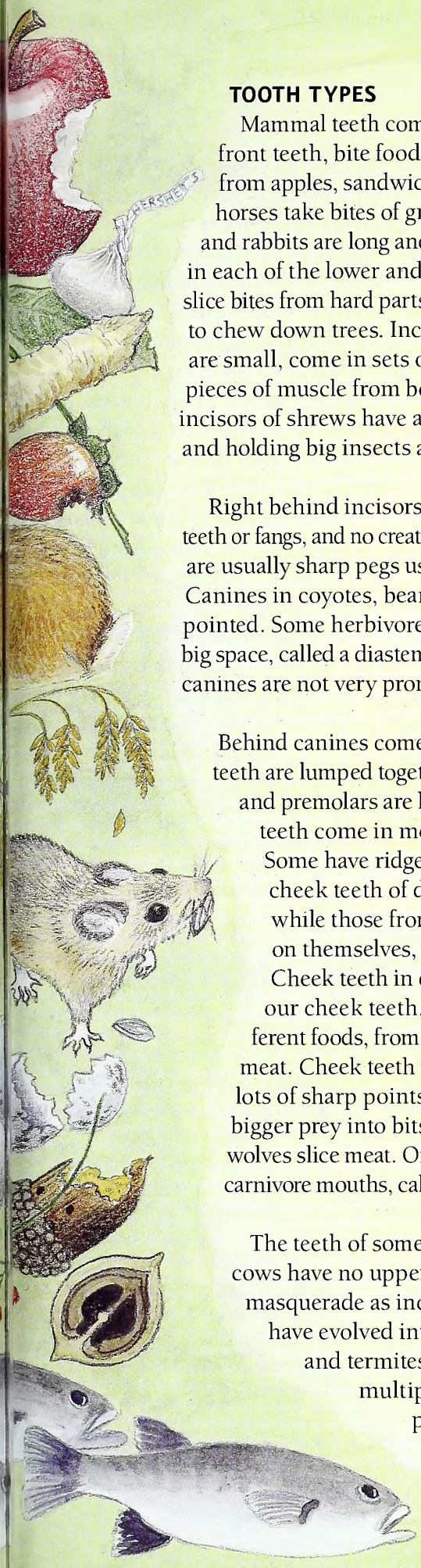
TOOTH TYPES

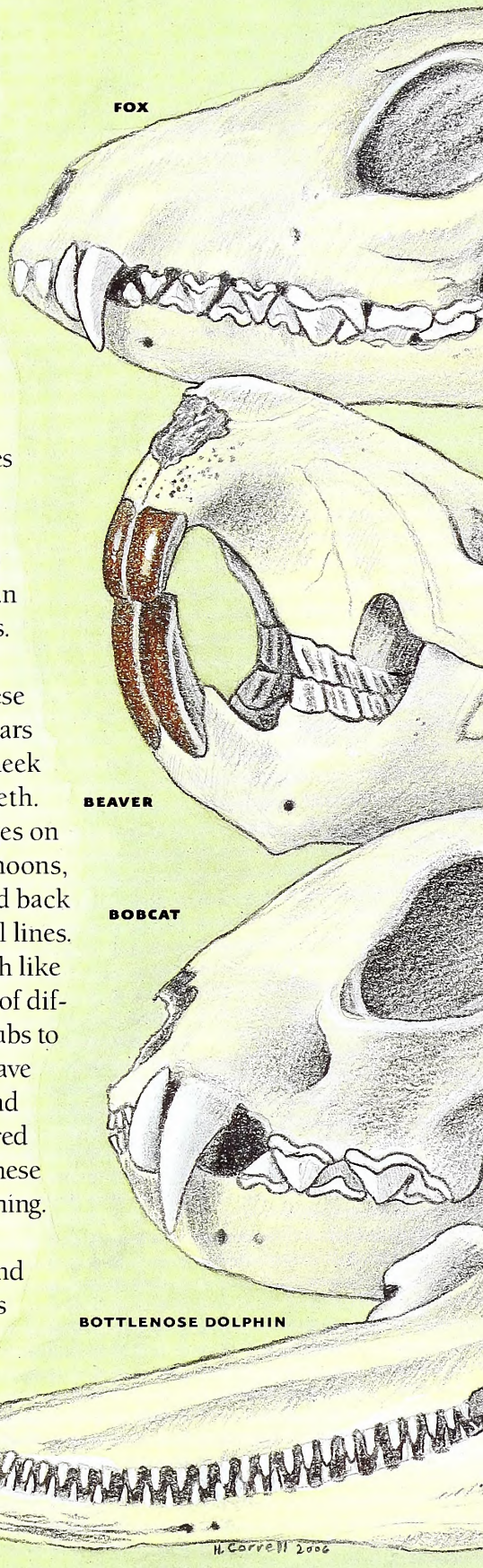
Mammal teeth come in four types. Incisors, the very front teeth, bite food. In your mouth, incisors take bites from apples, sandwiches and carrots. Incisors of deer and horses take bites of grasses and leaves. Incisors of rodents and rabbits are long and sharp, with one pair of big incisors in each of the lower and upper jaws, and those incisors can slice bites from hard parts of plants. Beavers use their incisors to chew down trees. Incisors in foxes, bobcats and weasels are small, come in sets of six in each jaw, and can pull little pieces of muscle from bones. The dark, burgundy-colored incisors of shrews have a special, sharp shape for catching and holding big insects and other invertebrates.

Right behind incisors come canines, sometimes called eye teeth or fangs, and no creature has more than two in each jaw. Canines are usually sharp pegs used to catch and to hold struggling prey. Canines in coyotes, bears, opossums and bats are all long and pointed. Some herbivores lack canines entirely and just have a big space, called a diastema, where their canines would be. Human canines are not very pronounced, and generally act like incisors.

Behind canines come premolars and molars. Sometimes these teeth are lumped together and called cheek teeth because molars and premolars are hard to tell apart in some mammals. Cheek teeth come in more shapes and sizes than any other teeth. Some have ridges for grinding plants. The enamel ridges on cheek teeth of deer and elk are shaped like crescent moons, while those from beavers and voles form loops that fold back on themselves, and those from rabbits come in parallel lines. Cheek teeth in deer mice, raccoons and bears are much like our cheek teeth, with rounded cusps for chewing lots of different foods, from nuts and berries to adult insects and grubs to meat. Cheek teeth in opossums, shrews, moles and bats have lots of sharp points for pulverizing and cutting insects and bigger prey into bits. Cheek teeth in bobcats, minks and red wolves slice meat. One pair of slicing teeth on each side of these carnivore mouths, called the carnassials, are even self-sharpening.

The teeth of some mammals break the rules. Deer, elk and cows have no upper incisors at all and their lower canines masquerade as incisors. All the teeth in armadillos have evolved into little stubs for smashing ants and termites. And teeth of dolphins have multiplied into long rows of pointed, canine-like pegs for catching fish.

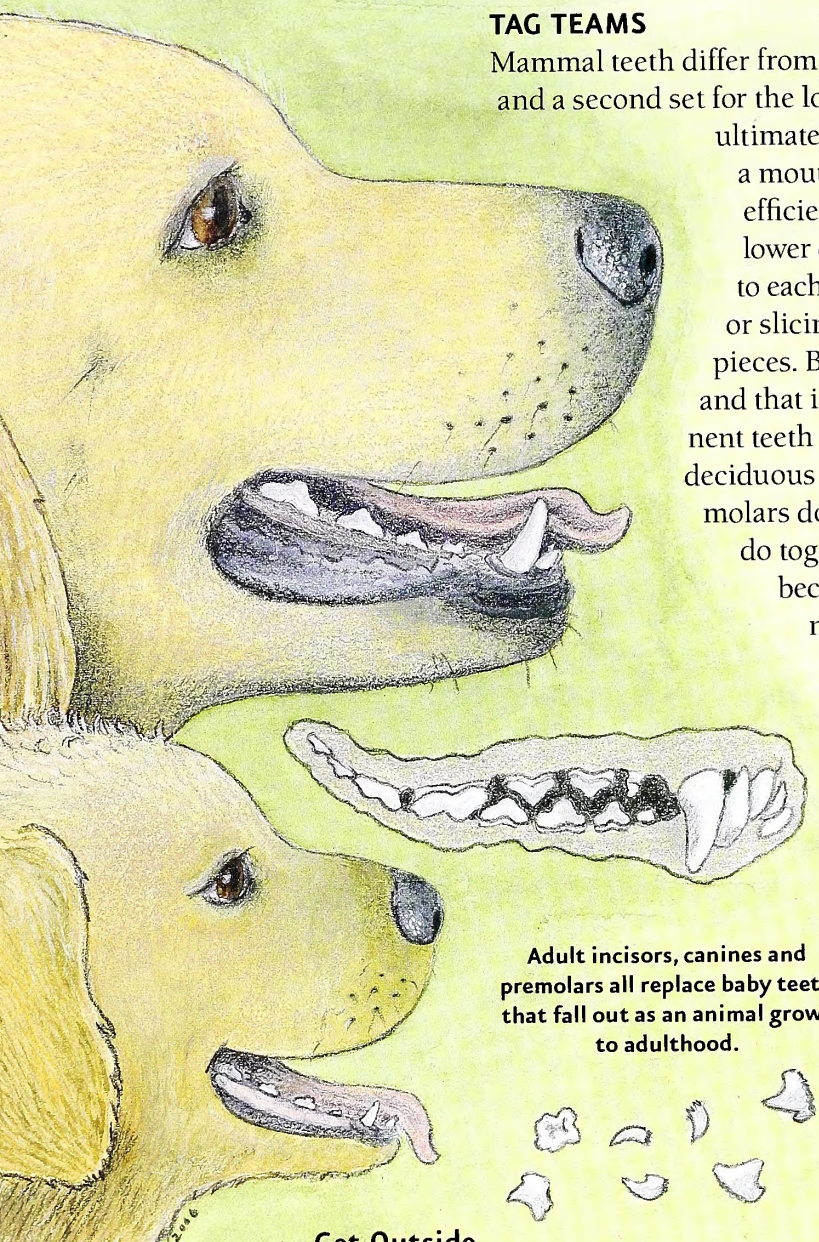




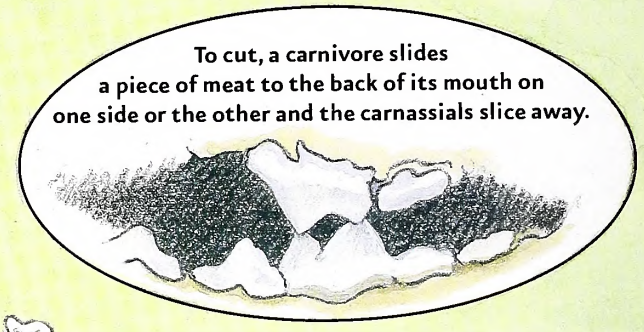
TAG TEAMS

Mammal teeth differ from teeth of fish and reptiles by having one set for early work and a second set for the long haul. The early set are deciduous or baby teeth and are ultimately replaced by the permanent or adult teeth. Each tooth in a mouth has a job: to bite or grab or slice or grind and to work efficiently. Those teeth must be perfectly matched. Upper and lower deciduous incisors meet perfectly. Canines snuggle next to each other when the mouth closes. And the complicated ridges or slicing edges of upper and lower cheek teeth meet like puzzle pieces. But deciduous teeth are too small for an adult mammal, and that is why permanent teeth are needed. The last of the permanent teeth are the molars. Molars are different because they have no deciduous teeth to replace. In young mammals, deciduous premolars do the job alone that permanent premolars and molars do together in adults. The two teams are very important because, unless they come in matched teams, their different members cannot do their jobs right.

Teeth in reptiles and fish are all pretty much pointed spikes and have the comparatively simple job of grabbing and holding food so it can not get away. They need not match perfectly for this job and can fall out and be replaced with no fixed schedule.



Adult incisors, canines and premolars all replace baby teeth that fall out as an animal grows to adulthood.



To cut, a carnivore slides a piece of meat to the back of its mouth on one side or the other and the carnassials slice away.

Get Outside

Take a close look at some teeth. Start with your own mouth. Take a look in the mirror and identify your incisors, canines and premolars or molars. Count how many teeth are in your mouth; do you still have more teeth to come yet? See the cutting edges of your incisors and the grinding surfaces of your molars? Now, when you eat, think about what your teeth are doing. What teeth are you using when you eat the following foods: corn on the cob, popcorn, chicken drumstick, peanut butter sandwich, banana, ice cream cone?

Look at some other teeth, if you can, and compare them to your own. If you have an easy-going pooch, maybe it will let you lift up its lips to take a look at those dog teeth. Look at the differences from your teeth. (And don't forget to give your friend a thank-you dog biscuit for cooperating with your explorations.)

Do you have a pet hamster, guinea pig or other rodent? Watch while it eats, and see how it uses its big incisors. Do you see other teeth in its mouth? You might have to wait until it yawns to get a good look.

Museums often have skulls you can look at. Compare the differences between carnivores such as foxes, rodents such as beavers and plant eaters such as deer. What similarities and differences do you see?

Read and Find Out

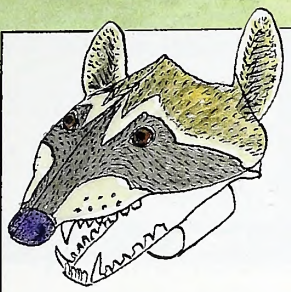
- "A Look at Teeth" by Allan Fowler, Children's Press, 1999.
- "Up Close: Teeth that Stab and Grind" by Diane Swanson, Greystone Books, 2000.

In *Wildlife in North Carolina:*

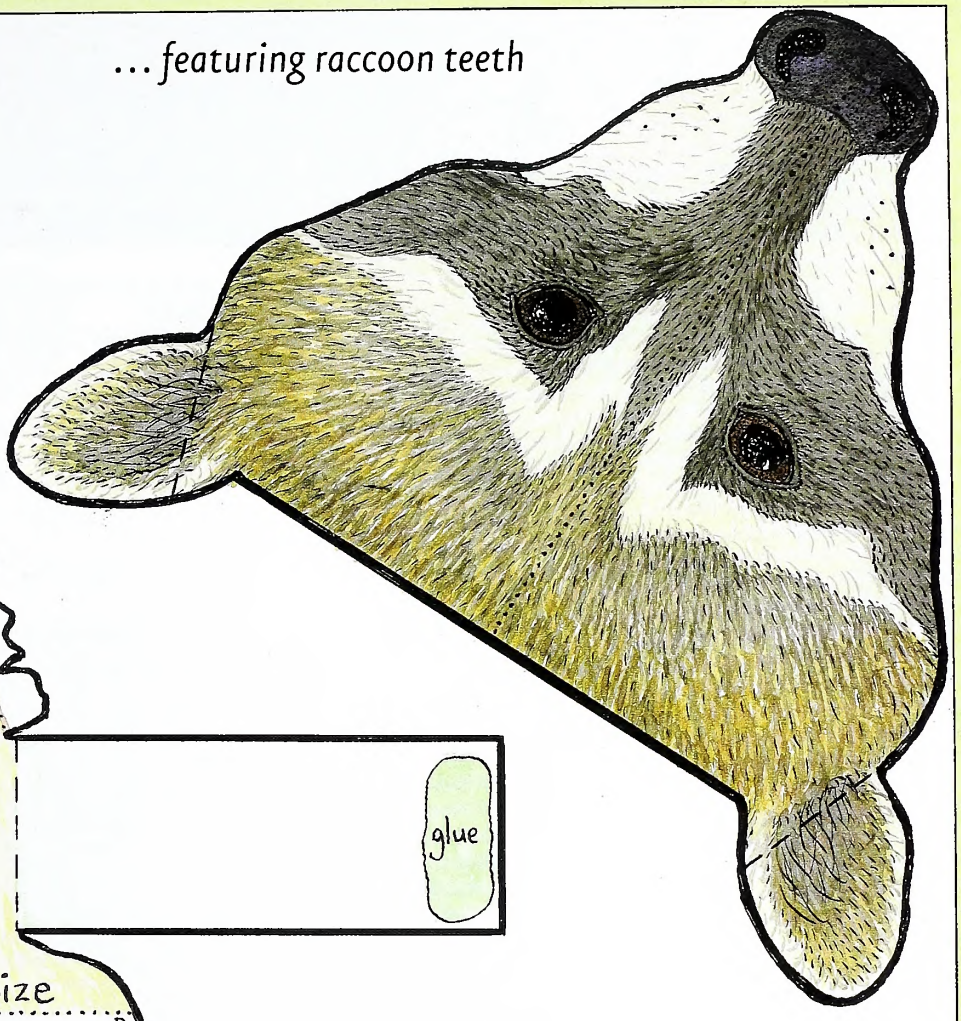
- "The Truth Is in the Teeth" by Dan Kibler, September 1997.
- "Tremendous Teeth" by Roger A. Powell, March 1999.

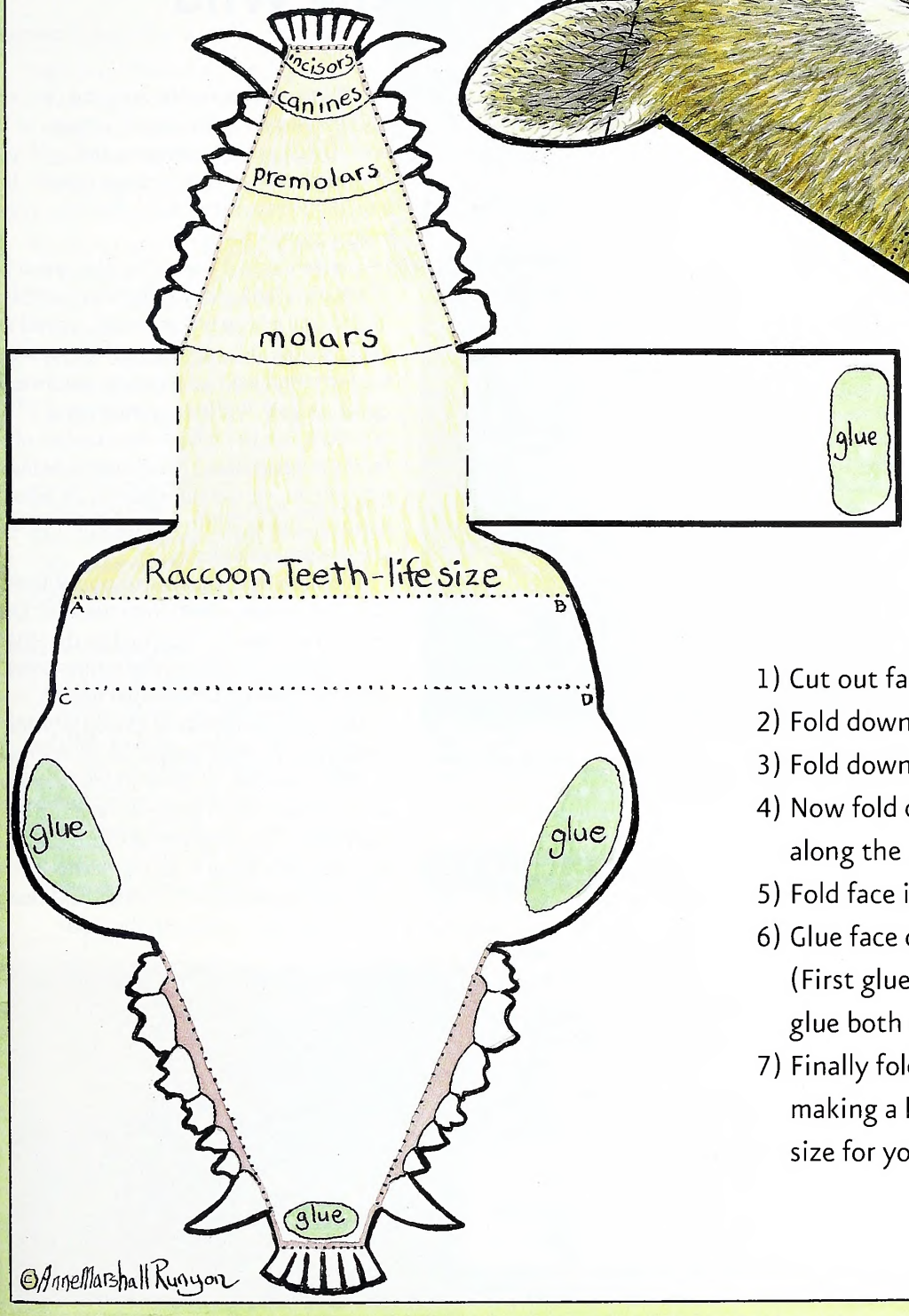
Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Chomper Finger Puppet

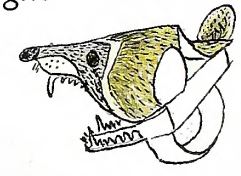


... featuring raccoon teeth





1) Cut out face and jaws along black lines.
2) Fold down lower jaw line from A to B.
3) Fold down upper jaw line from C to D.
4) Now fold down all four rows of teeth along the ... lines.
5) Fold face in half along ... line.
6) Glue face on top of upper jaw. (First glue at nose, then match and glue both cheeks.)
7) Finally fold up the two tabs and glue, making a loop just the right size for your finger.



©AnneMarshallRunyon

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

It's Best To Leave Fawns in the Wild

With fawning season in full swing, biologists with the N.C. Wildlife Resources Commission once again are reminding people not to approach, touch or remove any white-tailed deer fawns they might encounter. At the peak of fawning season in May and June, people see fawns left alone and assume they have been abandoned by the doe.

Usually, this is not the case. Whitetails are a "hider" species, which means the female will hide her fawn in vegetation during the first two or three weeks of its life as she feeds. Dappled and lacking scent, fawns are well camouflaged and usually remain undetected by predators. The doe will return to the fawn several times a day to nurse and clean it, staying only a few minutes each time before leaving again to seek food. The doe also will consume the fawn's excrement to eliminate odor that might attract a predator.

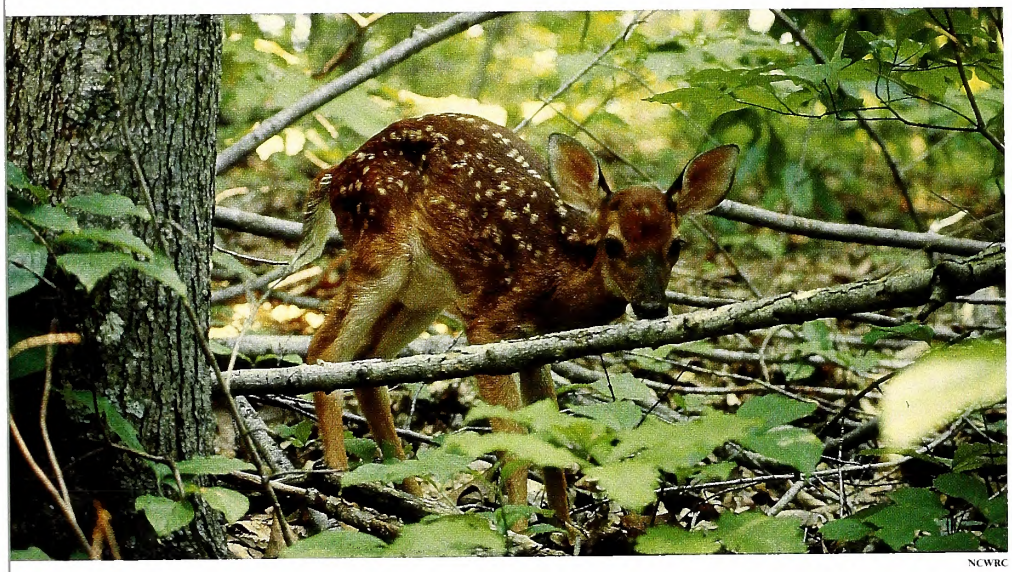
Fawns are not as helpless as they might appear. By the time a deer is 5 days old, already it can outrun a human. At 3 to 6 weeks of age, fawns can escape most predators. Typically, fawns are functionally weaned by about 10 weeks and begin eating vegetation and other browse, although they may continue to nurse for another 4 to 6 months. With a diet that may include more than 500 types of plants, fruit and mast, whitetails have proven to be an exceptionally adaptable species. Now numbering about 1.1 million in North Carolina, deer have made themselves at home not only on farms and forests, but also in suburban yards and parks.

Unless a fawn is in imminent danger — for example, being attacked by dogs or injured in a tractor mowing accident — the best decision always is to leave it alone. If you are concerned about the fawn, leave the area and check on the fawn the next day. Do not remain in the area. Does are very cautious and will not approach a fawn if she senses danger. It is a myth, however, that does will reject a fawn with a human scent.

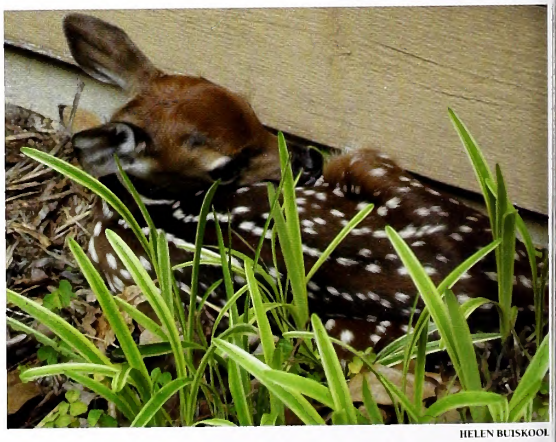
If a fawn is in the same location when you check on it the following day and is bleating loudly, or if a fawn is lying beside a dead doe (likely at the side of a highway), do not take the fawn into your possession, but instead contact the Wildlife Commission at (919) 707-0040 for the telephone number of a local permitted fawn rehabilitator. You also may obtain contact information for rehabilitators at the Wildlife Commission's Web site, www.ncwildlife.org.

It is both biologically irresponsible and illegal to remove a fawn from the wild. Only fawn rehabilitators permitted by the Wildlife Commission may keep white-tailed fawns in captivity for eventual release.

With the exception of trained wildlife rehabilitators, most people are ill-equipped to care for a fawn, so their attempts to save an abandoned fawn typically do more harm than good. The majority of captive fawns which are not taken to an experienced rehabilitator eventually die. A fawn's best chance of survival is to remain in the wild.



NCWRC



HELEN BUISKOOL

As a "hider" species, white-tailed deer will hide fawns in vegetation in the woods or a field. Below: Sometimes that vegetation can be as sparse as this liriope beside a house in Carrboro.

CALENDAR OF EVENTS

FRIDAY, JUNE 2

Learn the basics of fly-fishing, including casting techniques and fly identification, at the Pisgah Center for Wildlife Education in Pisgah Forest. Ages 16 and up. Equipment provided. For more information and to preregister, call (828) 877-4423.

SATURDAY, JUNE 3

- Kick off National Fishing and Boating Week by taking a child fishing at the Youth Fishing Rodeo at Strayhorn Pond near Chapel Hill. Call (919) 245-2660.

- Join in the festivities at Take a Kid Fishing Day at the John E. Pechmann Fishing Education Center in Fayetteville. Event runs from 8 a.m.–noon. Contact (910) 868-5003 or visit www.ncwildlife.org for other fishing opportunities for kids.

SATURDAY–SATURDAY, JUNE 10–17

Check out the 47th annual Big Rock Blue Marlin Tournament in Morehead City. Telephone (252) 247-3575 or visit www.thebigrock.com.

SUNDAY–FRIDAY, JUNE 11–16

Learn about the outdoors, hunting, firearms safety, canoeing, careers in wildlife biology and much more at the 24th annual Fur, Fish 'n Game Rendezvous at Millstone 4-H Center near Ellerbe. Contact Renee Strnad at (919) 515-5518 or visit www.ces.ncsu.edu/forestry/ffng.htm.

SUNDAY, JUNE 18

Celebrate Father's Day by learning to fly-fish in the Introduction to Fly-Fishing Skills for fathers and sons at the Pisgah Center for Wildlife Education in Pisgah Forest. Equipment provided. Sons must be at least 9 years old. Contact (828) 877-4423 or visit www.ncwildlife.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Lominac Named Wildlife Enforcement Officer of the Year

Master Officer Timothy Lominac of Murphy has been named North Carolina's Wildlife Enforcement Officer of the Year. Lominac, an 11-year veteran of the N.C. Wildlife Resources Commission, received the honor in March at the Governor's Conservation Achievement Awards banquet in Raleigh. The awards are the highest natural resource honor in the state, presented annually by the N.C. Wildlife Federation to recognize those who have exhibited an unwavering commitment to conservation.

NCWRC

Lominac was honored for his efforts in law enforcement, which include breaking up a deer and turkey poaching ring in Cherokee County. That case began with a random spotlighting arrest in the Nantahala National Forest. Lominac continued the investigation, both in the field and by computer research, which eventually led to nine people being charged with 150 wildlife violations and 47 drug violations.

Lominac credits the cooperation of fellow officers with the Wildlife Commission and other area law enforcement agencies for the success in shutting down the criminal enterprise. "Without their assistance it would have been too great a challenge to serve the many warrants and log the mounds of evidence," he said.

Lominac was also recognized for outstanding work in conservation education. He conducts regular programs in boater safety certification, hunter safety programs and youth fishing events.

"I'm most proud of our hunter safety program," he said. "We have participation of all three high schools here [in Cherokee County] and have teams competing in the Youth Hunter Safety Tournaments. The commitment of the coaches and the kids is just great."

A native of Cherokee County and a Murphy High School graduate, Lominac earned a degree in criminal justice from Western Carolina University. He began work for the Wildlife Commission in Alleghany County in 1994 and was later stationed in Graham County before returning home to his current assignment. Lominac lives in Murphy with his wife, Shannon, and their two sons, Cody, age 5, and Caleb, 3.

"You really take things to heart when it's home," Lominac said. "There's a strong heritage in the mountains of folks enjoying the outdoors, and parents going hunting and fishing with their children. You want to work hard to protect those resources."

ON PATROL

ILLUSTRATED BY JACKIE PITTMAN

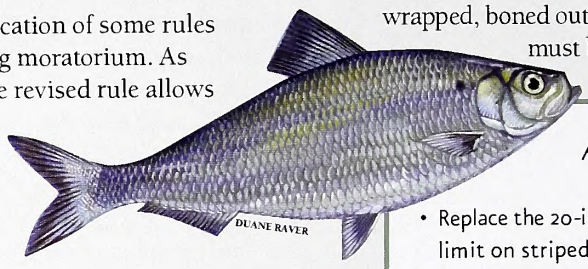
District One Officer Mark Rich was working fishing on the banks of the Chowan River when he saw two vehicles parked beside the water and two people sitting at the end of a pier. Rich asked the people in one of the vehicles who was on the pier, and the people told him the names of a man and a woman. Rich recognized the man's name and had a warrant for his arrest. While writing a person in the vehicle a citation, Rich just kept an eye on the pier, knowing that they could not go anywhere without walking by him.

After issuing the citation, Rich noticed there was only one person on the pier. After talking to the woman, Rich discovered that the man had taken off his clothes and jumped into the river. After searching for him for two hours and finally tracking him into a field near the river, Rich arrested the man at his home, and the man spent two days in jail.

Commission Adopts Changes for River Herring

The N.C. Wildlife Resources Commission has approved 54 changes to state hunting, fishing and trapping regulations, including a moratorium on fishing for river herring and restrictions on importing deer parts from other states. The new rules take effect for hunting, fishing and trapping seasons that begin on July 1. The rules changes underwent a series of public hearings across the state in January.

Public input led to the modification of some rules changes, such as the river herring moratorium. As approved by the commission, the revised rule allows anglers to possess alewife and blueback herring — collectively known as river herring — up to 6 inches long in the inland fishing waters of coastal rivers and their tributaries. Fishermen will be prohibited from possessing fish over 6 inches. "The intent of the moratorium is to protect migrating herring during their spawning runs," said Bob Curry, chief of the Division of Inland Fisheries. "We are hopeful that over time herring populations in our coastal rivers will begin to rebuild."



The N.C. Division of Marine Fisheries (DMF) trimmed the recreational catch in joint and coastal waters from 25 fish to 12 per day. The commercial season ended in April. DMF, which expects to have a new fisheries management plan for river herring this month, cut the commercial catch from 300,000 to 100,000 pounds. In 2004, commercial fishermen harvested 188,541 pounds of river herring, with a value of $80,694.

Also approved by the Wildlife Commission was a limitation on importing parts of deer and related animals from states or Canadian provinces that have had an occurrence of chronic wasting disease. To protect North Carolina's deer, elk and other cervids from the fatal disease, the new rule restricts what parts of a cervid a hunter may bring into the state. Antlers and finished taxidermy products are permitted; teeth and skull caps must be cleaned; meat must be cut and wrapped, boned out and have no spinal column or head attached; hides must be caped; and all products must be clearly labeled.

Among other changes adopted:

- Replace the 20-inch minimum length limit and four fish per day creel limit on striped bass and hybrid bass in Kerr Lake with a 26-inch minimum and two fish limit from Oct. 1–May 31 and no minimum length limit and four fish limit from June 1–Sept. 30.
- Replace the 20-inch minimum on striped bass and hybrid bass in Lake Norman with a 16-inch minimum from Oct. 1–May 31 and no minimum length from June 1–Sept. 30. The daily creel limit remains four.
- Establish a 14-inch minimum length and five fish per day creel limit for largemouth bass on the new Randleman Reservoir.
- Add mute swan to the list of species for which it is illegal to import, transport, export, purchase, possess, sell, stock or release in waters in North Carolina.

A complete list of rule changes is available at www.ncwildlife.org.

Rainbow Record Falls to Sapphire Woman

Leah Johnson, a 21-year-old from Sapphire, has broken the state record for rainbow trout after landing a 20-pound, 3-ounce fish from the Horsepasture River in Jackson County on Jan. 28. Johnson caught her record-breaking rainbow, which measured 34½ inches in length and 23½ inches in girth, using a black and brown Rapala lure on an ultralight rod and reel.

NCWRC

The fish was weighed on certified scales in Brevard and verified by Powell Wheeler, a fisheries biologist with the N.C. Wildlife Resources Commission. The previous state record rainbow, caught by Terry Gregory of Franklin on Dec. 20, 1989, weighed 16 pounds, 5 ounces. According to International Game Fish Association records, the largest rainbow trout on record weighed 42 pounds, 2 ounces and was caught from Bell Island in Alaska in 1970.

To qualify for a state record, anglers must have caught their fish on a hook and line, must have their fish weighed on a certified scale witnessed by one observer, have the fish positively identified by a qualified expert from the Wildlife Commission and submit an application with a full, side-view photo of the fish.

IN SEASON

This month, this season is open in North Carolina:

Crow: Wednesday, Friday and Saturday of each week, plus Labor Day, Thanksgiving and Christmas each week through Feb. 28.

Check the *2006–2007 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

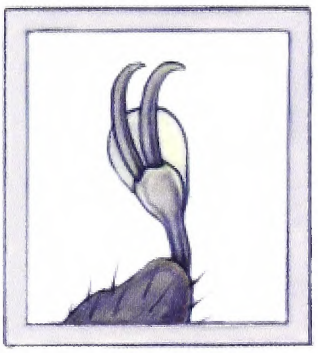
How Do Ticks Find Hosts?

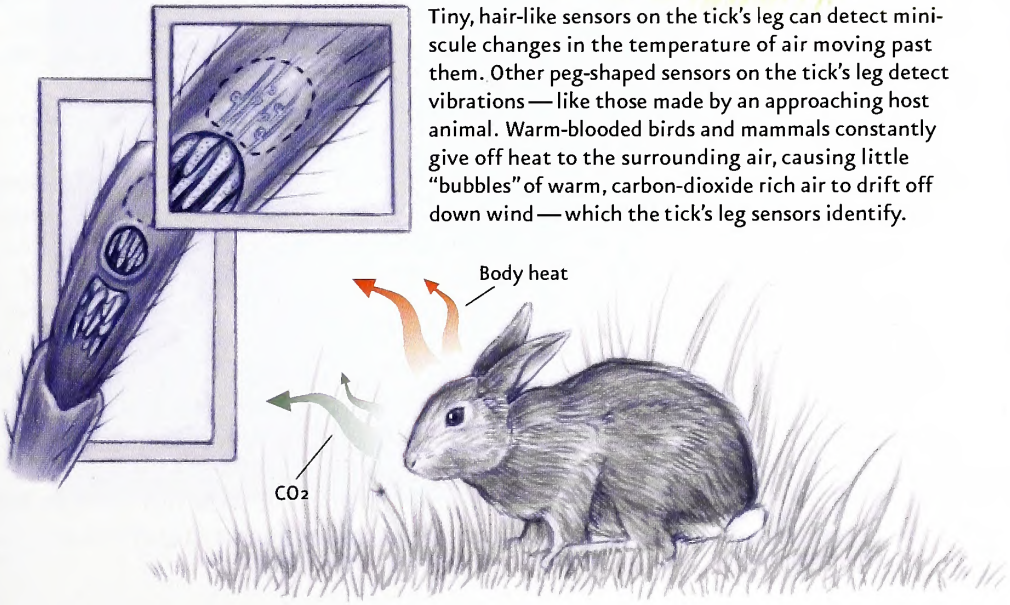
written by Clyde Sorenson
illustrated by Alison Schroeer

TICKS ARE ESSENTIALLY BLIND, and they don't have antennae like insects and other arthropods. So evolution has made sense organs out of their front legs.

Haller's organs are small pockets in the tick's forelegs. The pockets funnel air to cells that can detect carbon dioxide—a gas given off by all living animals. Other cells in the Haller's organs respond to specific chemical components of the odors of the tick's preferred host, helping ensure that the tick feeds only on animals that will provide adequate nutrition, and making it easier for adult males to find willing females for mating.

The tick puts its multi-purpose front legs to one more task—tiny hooks on the tips help the creature latch on to its host and crawl to a safe feeding site.





Tiny, hair-like sensors on the tick's leg can detect minuscule changes in the temperature of air moving past them. Other peg-shaped sensors on the tick's leg detect vibrations—like those made by an approaching host animal. Warm-blooded birds and mammals constantly give off heat to the surrounding air, causing little "bubbles" of warm, carbon-dioxide rich air to drift off down wind—which the tick's leg sensors identify.

An Unlikely Story

written by Jim Dean

I have never told this story because it involves family history, which means I'm poorly positioned to judge whether it might be interesting to others. But the coincidence is so strange that I've decided to risk it.

When my grandfather W.S. Dean died in 1968, he left me his fishing tackle. His bamboo casting rod, Pflueger Supreme reel and a few lures were the only physical remnants of the many good times we'd shared fishing an old millpond near Littleton. Each summer, he had also led family expeditions to a primitive fish camp built on pilings over the water in the broad mouth of the Alligator River (I wrote about these trips in "Little Alligator Summers" first published in *Wildlife in North Carolina*, and later in "The Secret Lives of Fishermen," published in 2000 by the UNC Press).

JIM DEAN

In 1969, I moved to Raleigh to join the staff of this magazine, and I began to collect old tackle to add to granddad's stuff. A year or so after I moved, I read that an estate was going to be auctioned at the old Lassiter Mill (it later burned, and the land where it stood along Crabtree Creek is now a city park). Some fishing tackle was listed, so I went to see it the day before the sale.

I had never been to an estate sale, and I was fascinated. Among the items on display was a massive 12-foot-long mirror with an ornately carved, gilded frame. Where had I heard about such a mirror?

When the auctioneer showed me the tackle I was disappointed. A steel casting rod and reel and a metal tackle box containing floats, rusty hooks and a few lures in sad shape comprised the lot. Only one old Heddon 3-hooker interested me. But the stuff was old, so I tried to determine what, if anything, to bid. Money was tight.

Then, I spotted a pill bottle and glanced at the label. When I could finally speak, my voice was trembling.

"I know this is going to sound unbelievable," I said, "but I'm kin to this family."

The auctioneer's face blanched. "You're a relative? How do you know?"

I showed him the name on the old prescription bottle. "This man's wife and my grandmother were sisters. I haven't seen them in many years, but I remember them well."

"Oh my," said the auctioneer in distress. "Your great uncle died recently, and his wife specifically requested that the family name not be advertised." Both of us were stunned by this staggering coincidence, and its potentially troublesome consequences.

"Well, I think I may know why," I said finally. "I was very young, but I recall that the sisters sometimes didn't get along very well or keep in touch. I never knew what led to their disagreement, and I doubt anybody else remembers, either. I'm guessing my grandmother's sister wishes to avoid complications with her sister and other relatives she hardly knows anymore." I added that I had no intention of interfering because my grandmother was very ill, and my grandfather had recently died.

The auctioneer seemed relieved. I told him that my grandfather and this lady's husband had remained good friends despite their wives' differences, and had often fished the Little Alligator River together. I also explained how they had maintained a bemused and detached view of the sisters' disagreements. I also recounted how the two sisters (and a third sister long dead) had grown up on a land-grant plantation in Sampson County at the turn of the century, but that they had been orphaned at an early age when the family fell on hard times. Later, the sisters had inherited a few remaining items from the estate.

"I believe that big mirror was one of a pair that hung on each side of a grand stairway in the entrance of that old plantation home," I said. "I remember my grandmother describing that place, and talking about seeing those mirrors when she was a child. Life there must have made quite an impression on those young girls, especially considering what happened to them."

Then I spent a strange, yet oddly satisfying, afternoon looking at things that may have once been familiar to my grandmother, her siblings and ancestors I knew only by name and from faded photos. It seemed almost as though time had collapsed—lifetimes condensed in an eye blink. How could my discovery of that pill bottle be mere coincidence, yet what other explanation could there be?

The following afternoon, I sat among the bidders and made my meager bid when the time came. I didn't see who bought the mirror, but I believe it would have pleased my grandmother's sister, and especially my great uncle, to know that I brought his fishing tackle home.

"It seemed almost as though time had collapsed—lifetimes condensed in an eye blink."

KEVIN ADAMS

Catawba rhododendron

OUTDOOR MOMENT

IN THE **JULY ISSUE**

TODD PUSSER

THAR SHE BLOWS!

When most people think "whale," the sperm whale is what comes to mind. These deep divers often surface off the N.C. coast.

PANFISH LURES

These seven artificials will work on bluegills, redbreasts and other panfish from one end of the state to the other.

NEW RIVER RECREATION

Access is easy, and the canoeing and fishing are good on the South Fork of one of the oldest rivers in North America.

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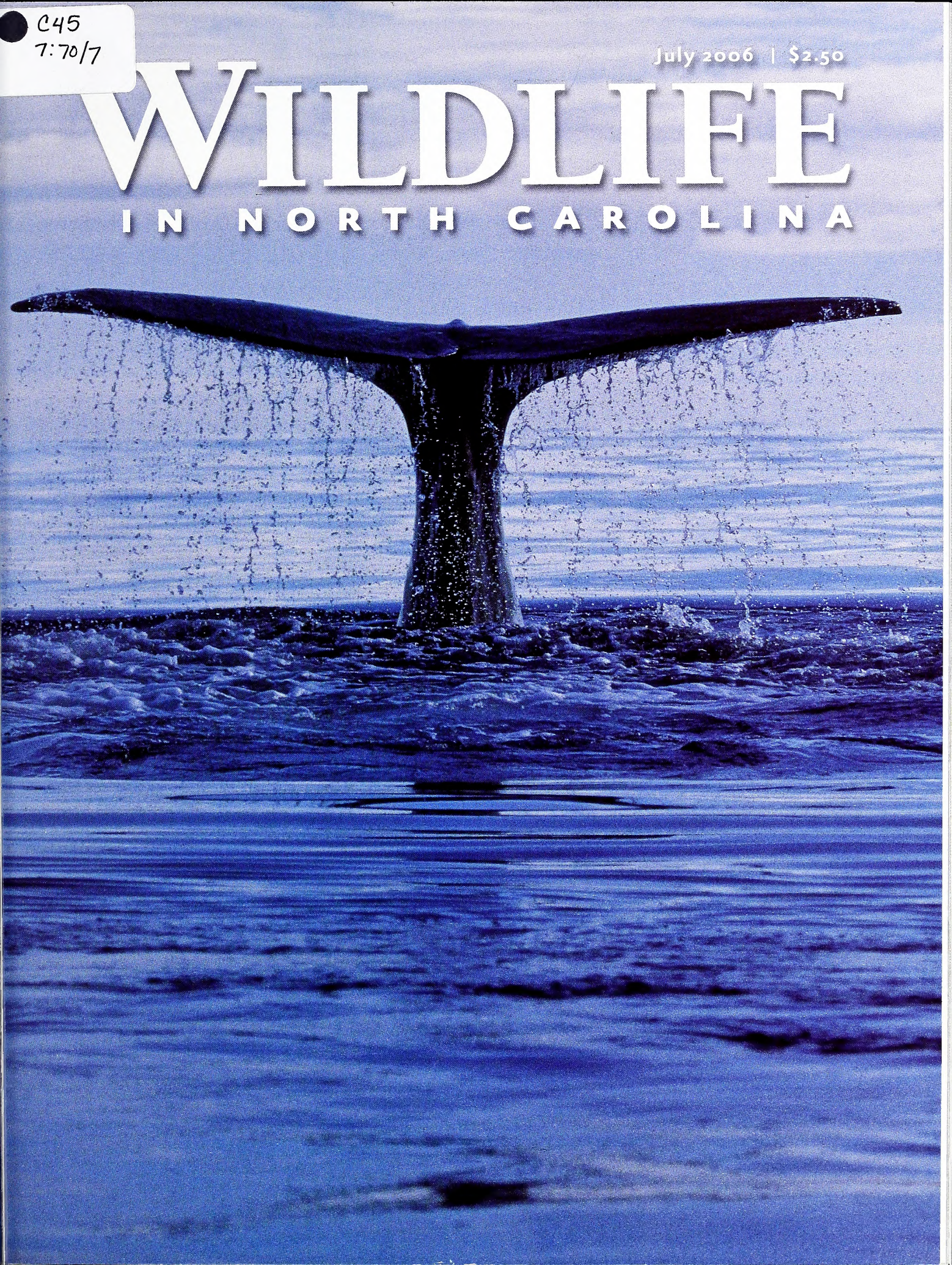

Cherokees use river cane to create beautiful baskets. Their renewed harvest of the wild plant has helped restore cane along mountain streams.
PHOTOGRAPH BY MELISSA MCGAW.

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Cover: The sperm whale, with its iconic tail flukes, is present but uncommon off the North Carolina coast year-round. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

"This is a really wet issue," I said to Jim Wilson as we were discussing the lineup of stories for this edition of the magazine. Indeed, every story in the issue is inextricably bound to water somehow. The sperm whale is one of the ocean's largest, most distinctive and most impressive creatures. Tasty and fun-to-catch panfish are found in almost every body of fresh water in the state. The South Fork of the New River is a gorgeous stream that offers a plethora of recreational opportunities for families. River cane is dependent on the floodplains of mountain rivers, just as the Cherokees who create beautiful crafts from it are dependent on the cane. And the highland creeks of western North Carolina inspired the creativity that resulted in numbers of people becoming highly influential fly-anglers during the sport's infancy in our state.

A. MACK SAWYER

If there is any month of the year you would want to get wet, July is it. By the time the fireworks have fizzled out on the Fourth, even the coolest mountain streams feel good to the skin. The ocean is just right, and reservoirs are full of people for good reason. Hot, humid summers are part of living in North Carolina. Sure, it feels great in the house with the air conditioning on full blast, but if you want to enjoy the outdoors, being near or in the water is the only way to go.

Water resources are a big reason our state is a great place to be in the summer, or any time of year. There are few places in the world where anglers can fish for mountain trout and blackwater creek bream on the same fishing license. Throw in North Carolina's amazing saltwater fishing—free until the Coastal Recreational Fishing License takes effect in January 2007—and it's hard to have more fun anywhere with a rod and reel than you can between the Great Smokies and the Gulf Stream.

So if you usually tend to hunker down in the AC during the dog days of summer, make an effort to spend some time outdoors this month. Whether it's whale watching, fishing or just floating on a sunny day, nothing is cooler than being out in the wet and wild.

Greg Jenkins

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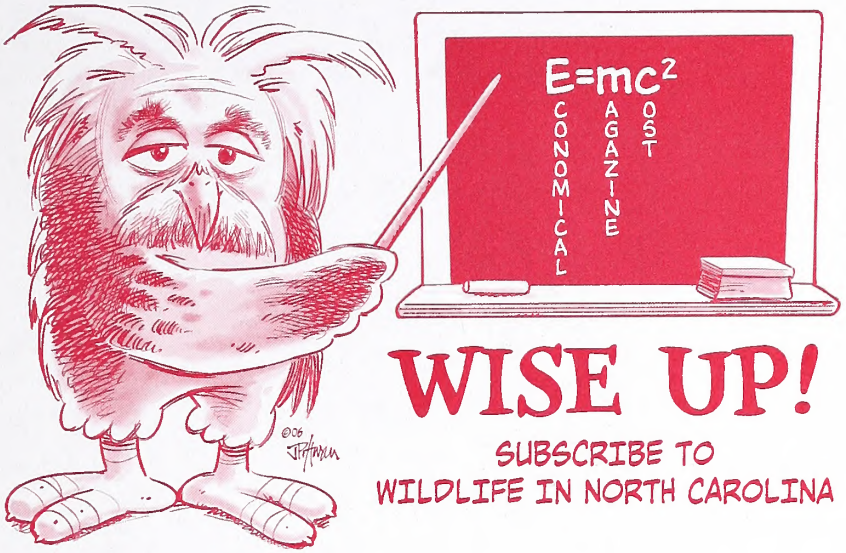

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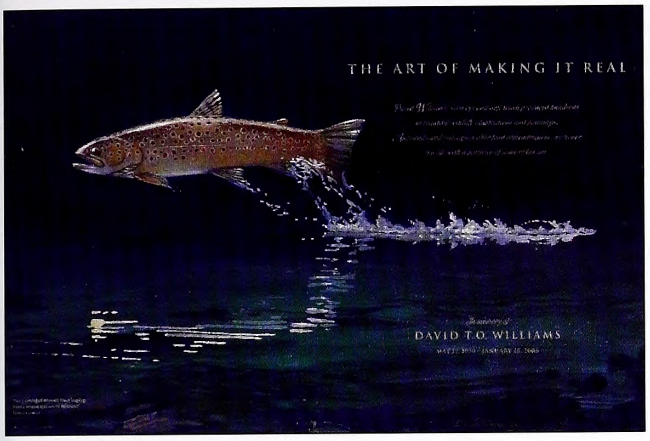

Fitting Tribute

I received my May issue and was shocked to learn of the death of David Williams ("The Art of Making it Real"). I have come to look forward to seeing David's drawings used to illustrate the wonderful Nature's Ways series. David's drawings in pencil and line were masterful, and they were rendered in beautiful economy and design. I always marveled at the surprising tonal effect of his work and the skill with which he would tackle difficult subject matter and clearly explain it with beautiful line art. The immediacy of a pencil drawing often will reveal more about an artist than a finished painting, and no one will equal David's drawings for Nature's Ways. Many people think art is easy, but on David's level it requires great skill and discipline.

In the many years that my art has been used in *WINC*, I never had the pleasure of meeting David. I talked with him briefly on the phone in the late 1970s regarding an article for the magazine. Not meeting him is a personal loss for me, and his passing is a loss all of us will feel for years to come. David, not too many artists earn the admiration of other artists, but you were one of the rare exceptions to the rule. You left far too early, but you left an indelible memory in the hearts of those who appreciated your work.

Robert B. Dance
Kinston

Thank you for the moving tribute to artist David Williams in the May issue, especially the decision to publish his unfinished illustrations — very poignant. He sounds like someone I wish I had known personally.

Andy Gwynn
Black Mountain

Shark Hunting

I thoroughly enjoyed your article "Fossil Fever" in the May 2006 issue of *WINC*. I have been shark tooth hunting along Carolina Beach since the mid-1980s, when we started to vacation there. About three years ago we moved to the Wilmington area from Pennsylvania, and we continue to hunt for teeth. Your article about the fossils found at the Martin Marietta quarry in Castle Hayne sounds very interesting. Can you provide more information on the N.C. Fossil Club? Thank you and continue the fascinating articles.

Jeff Nicol
Wilmington

View ncfossilclub.org, the N.C. Fossil Club's Web site, or write to P.O. Box 13075, Research Triangle Park, N.C. 27709, for more information.

Rare Bird?

Over the past several years I've been aware of the ivorybill being extinct ("Mr. Wilson's Woodpecker," May 2006), but I have also been observing woodpeckers throughout my travels of eastern North Carolina that I believe to be ivorybills. As a kid growing up back in the 1950s and '60s in "backwoods" Southern Illinois, I was a big-time hunter and observed these birds almost every day I spent in the field. I believe I am seeing the same bird today.

Approximately two months ago I was driving west on N.C. 24 between Autryville and Stedman when one flew across the road and into a wooded swamp area. I suspected the bird was an ivorybill by the slow, up-and-down flying manner and distinct, large, tan-colored bill, size and colors. About one week ago I was driving north on N.C. 32, approximately 2 miles north of U.S. 264 near Washington, when I saw what I believed was again an ivorybill on a logging road in a heavily wooded area. I stopped ahead and drove back cautiously, exited my vehicle short of the area with a camera and walked to the area. But the bird had departed prior to my arrival. I stood watching the trees for approximately 15 minutes, but the bird was never again observed. Is it possible I am observing an ivorybill or another species similar to an ivorybill?

Butch Gottschammer
Jacksonville

N.C. Partners in Flight coordinator Mark Johns: There are no ivory-billed woodpeckers in North Carolina anymore. At best, hundreds of years ago, they were uncommon in big cypress swamps in the southeastern tip of the state. That habitat is gone. Mr. Gottschammer is seeing pileated woodpeckers, which are common throughout the state in a variety of habitats and are similar in appearance to the ivory-billed woodpecker.

An Alluring Idea

I enjoyed the article on fly-tying in the April issue ("Just Add Water"). I've tied flies for a number of years and it is indeed a pleasant and rewarding pastime. I'd like to suggest that you do something on a similar craft — building custom fishing rods. I think this is especially appropriate for the magazine as North Carolina can arguably claim to be the world headquarters for custom fishing rods. Both *RodMaker Magazine* and the International Custom Rod Building Exposition are located in High Point. I hope you can find space to highlight another great fishing-related craft, as well as to celebrate North Carolina's very important place in the world of fishing rod making.

Craig Wirth
Thomasville

Acting Editor Greg Jenkins: Thanks for the idea, Craig. We will check out the ICRB Expo scheduled for Feb. 17–18, 2007, at High Point's ShowPlace Convention Center to investigate the possibility of a feature story.

write us

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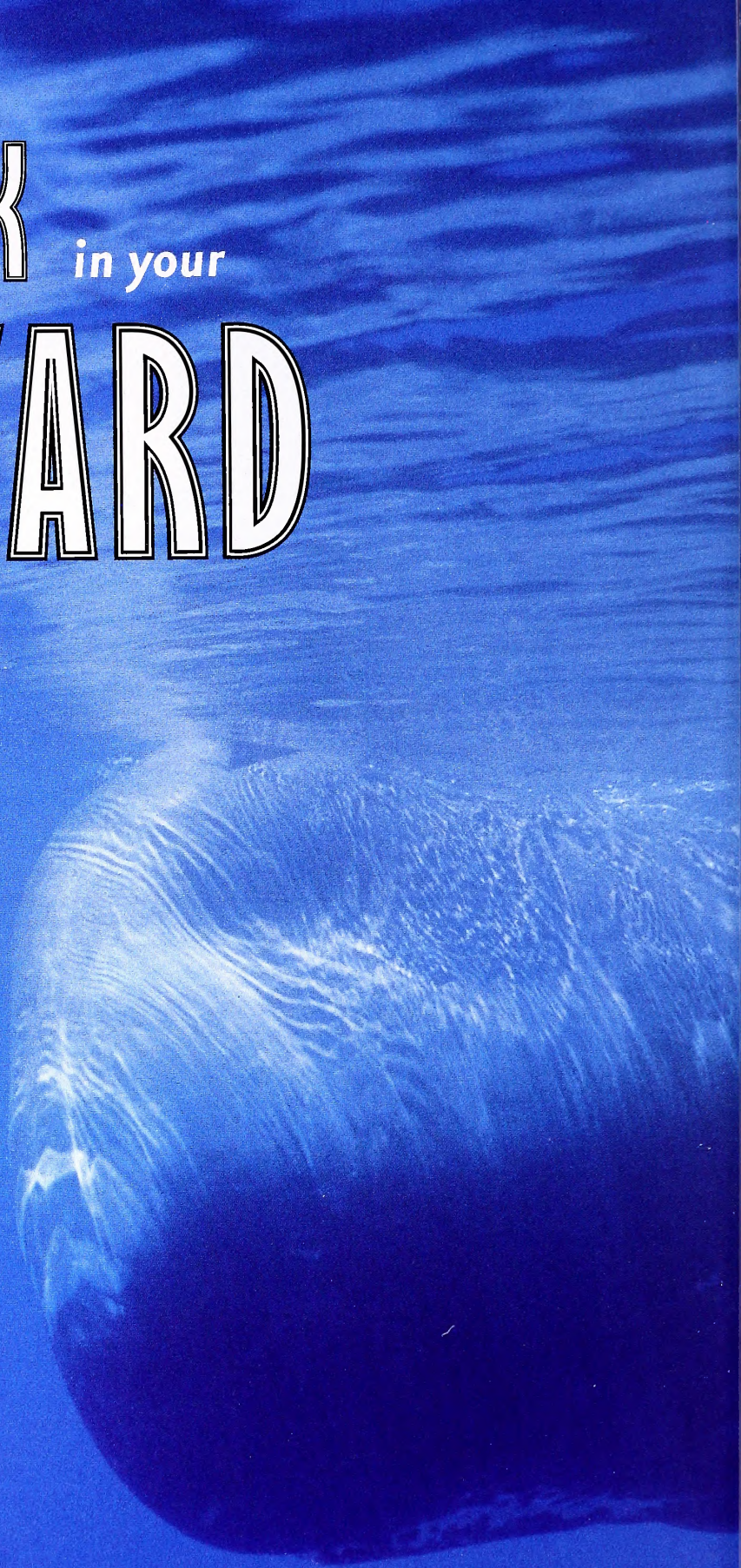
MOBY DICK *in your* BACK YARD

The remarkable and mysterious sperm whale, great beast of literature and legend, can be spotted off the North Carolina coast.

Written and photographed by TODD PUSSER



The bulk of the animal was tremendous. From the tip of its head to the notch in its tail flukes, the whale measured 54 feet, 2 inches in length. It was estimated to weigh more than 100,000 pounds. The throngs of people who ventured onto Wrightsville Beach that spring to observe the behemoth looked like ants next to the creature's immense 33-foot girth.

The year was 1928, and for many North Carolinians, it provided their first glimpse of the legendary creature known as the sperm whale. By some estimates 50,000 people from six states came to view the dead whale as it lay and baked under the warm April sun. The whale, dubbed "Trouble" for all the headaches its decomposing body caused Wilmington health officials, was eventually acquired by the N.C. Museum of Natural Sciences, where its skeleton was prepared for display by museum director H.H. Brimley. Trouble's skeleton, one of only a handful of adult male sperm whale skeletons on exhibit anywhere in the world, can still be observed today, hanging high from the rafters in the marine mammal hall of the museum in downtown Raleigh.

Mouth agape, Trouble lay on Wrightsville Beach for weeks before his body was taken to the N.C. Museum of Natural Sciences.

Above: A wide view of Trouble and a few gawkers. Bottom, opposite page: sperm whale tail flukes can reach 16 feet from tip to tip.

My own introduction to the sperm whale, *Physeter macrocephalus*, came when I was in junior high school. Much to my dismay, I was assigned to read Herman Melville's novel "Moby-Dick." Like most teenagers whose grade depended on a well-written report about classic American literature, I judged a book not by its cover but by its size and length. My personal edition of "Moby-Dick," like the title character, was immense—a whopping 726 pages long. It was a daunting read for any student.

With the help of Cliffs Notes and repeated viewings of the 1956 movie version starring Gregory Peck, I eventually managed to write a passing essay on Melville's novel for my seventh-grade teacher. It was not until later in life, after spending the better part of 12 years at sea observing sperm whales around the world, that I began to really appreciate Melville's novel. Not only is it a great sea adventure, it is also an accurate depiction of the natural history of the sperm whale.

DISTINCTIVE AND FASCINATING

Say the word "whale" and the image that usually comes to mind is that of a sperm whale. Sperm whales are the largest of the odontocetes, or toothed whales. Adult males can reach lengths of over 60 feet and weigh more than 60 tons. Females reach only half that size—around 35 feet and 25 tons. Largely because of "Moby-Dick" and stories such as the Bible account of Jonah and the whale, the sperm whale is instantly recognized by its unusual body form.

Its tremendous rectangular head, unique among the great whales, accounts for up to two-fifths of the animal's length. Inside this disproportionately large head lies an immense cavity filled with a strange, colorless, oily liquid called spermaceti. This unique liquid was the driving force behind one of America's most important 19th-century industries. Whalers took to the seas far and wide in pursuit of the sperm whale and its spermaceti oil, which was considered to be the finest lubricant of its time.

Despite the examination of many specimens over the last 200 years, scientists still do not fully understand the function of the spermaceti organ. It has been speculated that spermaceti can absorb almost six times as much nitrogen as whale blood can, thus preventing the formation of deadly nitrogen bubbles during surfacing from the deep dives of which sperm whales are masters. The oil may also act as a buoyancy regulator, enabling the whale to remain neutrally buoyant at any depth. Perhaps it aims and modifies sound generated by the sperm whale, giving the creature a loud, effective sonar system. Whatever its primary function, spermaceti is unique to the sperm whale.

Beneath the rectangle-shaped head is a long, underslung mouth lined with as many as 26 pairs of white, conical teeth that erupt only in the lower jaw. The teeth consist of pure ivory and have no enamel covering. They were highly prized by whalers of old who, in an art form known as scrimshaw, etched on these teeth elaborate scenes of whaling.

For the seasoned whale watcher, sperm whales are easily identified at sea. Essentially, they look like large, knobby floating logs. Sperm whales have a small, thick, rounded dorsal fin located two-thirds of the way down their backs. Their coloration is typ-

ically described as dark gray, though they often appear brown in bright sunlight. Like the title character in Melville's novel, white sperm whales have been observed from time to time at sea. Recently, a completely white sperm whale was photographed in waters surrounding the Azores.

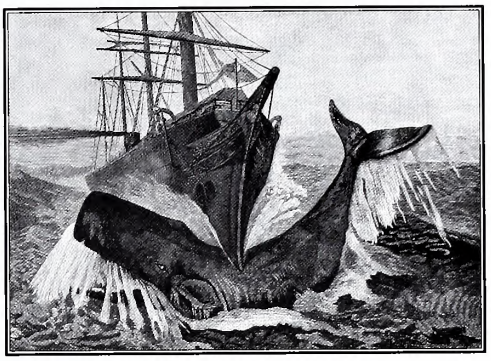
Sperm whales have a single S-shaped nostril known as a blowhole set forward on the left side of their heads, causing their blow to arch strongly at a 45-degree angle. This makes the species easily discernable at a distance. Sperm whales blow frequently while resting at the surface between deep dives. Often, when a sperm whale begins its dive, it will arch its back high and lift its tail flukes completely out of the water. Melville, so enamored of the beauty and grace of the sperm whale, dedicated an entire chapter to the creature's tail: "In no living thing are the lines of beauty more exquisitely defined than in the crescentic borders of the flukes," he wrote. The flukes are broad, 16 feet from tip to tip, deeply notched and triangle-shaped. Scientists take photos of the underside of the tail flukes to recognize individual whales. Like human fingerprints, the scarring patterns and notches in the trailing edge of the tail flukes are unique in each individual whale.

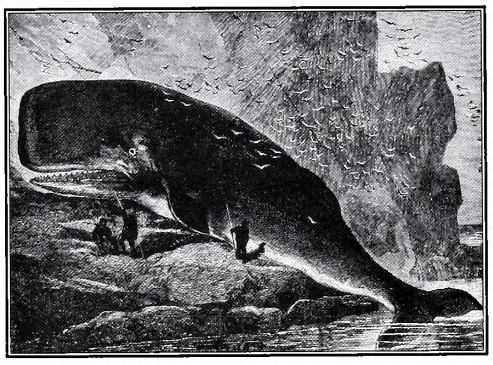
The sperm whale has the largest brain in the animal kingdom, even larger than that of an adult blue whale, the largest animal ever to live on earth. The brain of a full-grown adult male sperm whale can weigh more than 20 pounds. By comparison, the human brain weighs only 3 pounds. Why does an animal like the sperm whale need such a large brain? After all, brains are metabolically expensive organs. Perhaps the answer to this question can be found in the unique lifestyle of the sperm whale.

EXTREME LIVING

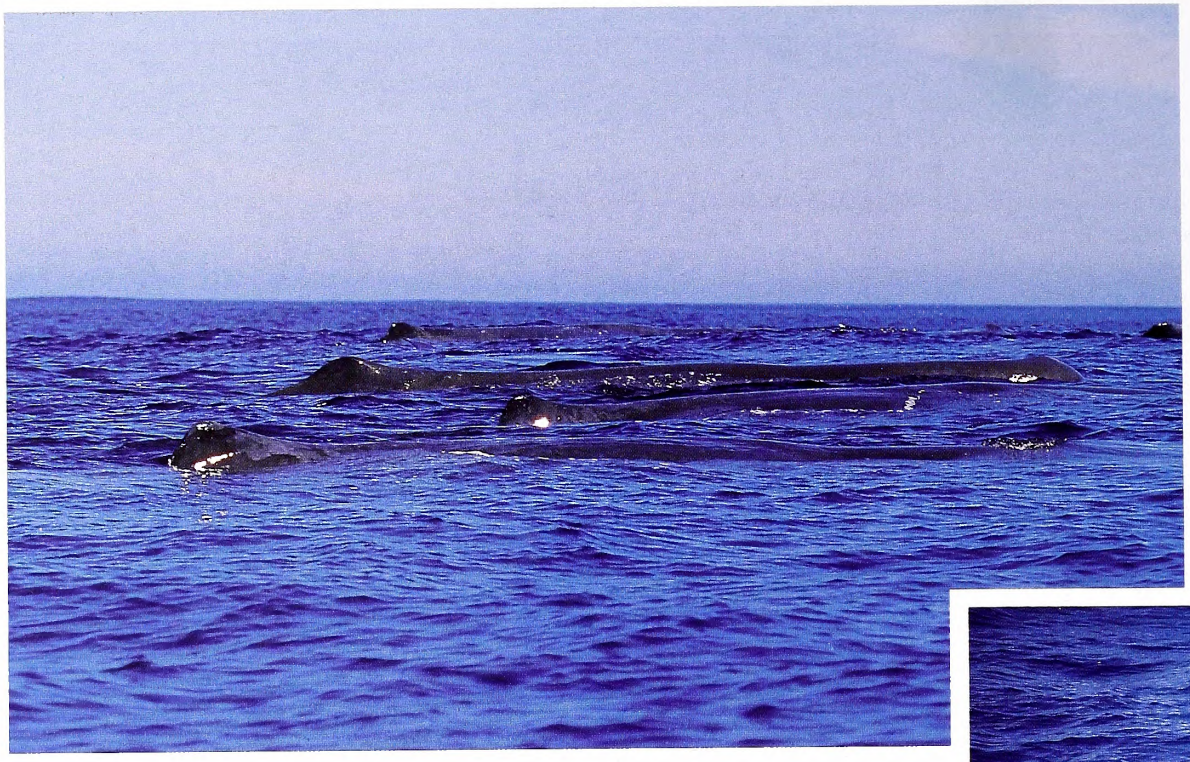
Sperm whales are creatures of extremes. They spend most of their lives foraging in the dark recesses of the oceans, routinely diving to depths of a mile or more. At such depths it is almost pitch black, with little or no ambient light. Much like bats, sperm whales use echolocation, sending out sound and processing the returning echoes, for navigation and to locate their preferred prey: squid.

Contrary to popular belief, sperm whales do not feed exclusively on another maritime legend, the giant squid (*Architeuthis*). Remains of giant squids have indeed been found in the stomachs of sperm whales, but these marine mammals prefer to eat smaller, deep-water cephalopods. Scientists hypothesize that sperm whales might be able to stun prey using focused bursts of sound. The sound is generated at high pressure amidst cartilage valve structures along their nasal passages and directed into the surrounding water through the spermaceti. Sperm whales also produce a series of clicks and creaks often referred to as codas. These codas seem to act as a form of communication between individuals in a group.





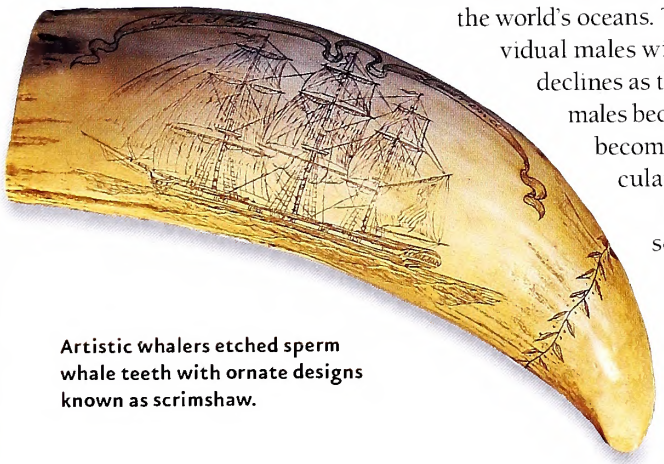
Woodcarvings often showed whalers in mortal battle with sperm whales, which were documented to ram ships occasionally.



Female sperm whales often travel in groups with their calves off the North Carolina coast. Their small, rounded dorsal fin aids in identification.

Sperm whales have an interesting social structure, with females dominating the core unit of sperm whale society. A typical sperm whale herd consists of stable, closely related groups of females and their calves. The herds, which can number several dozen individual whales, are found in tropical and temperate waters around the world, including the offshore waters of North Carolina. Males born into these matrilineal societies begin leaving the herd by the age of 6 years, when they join other young males in what are known as "bachelor schools." These bachelor schools tend to form in the colder, polar regions of the world's oceans. The cohesion among individual males within a bachelor school declines as the whales grow older. As males become sexually mature, they become more solitary, particularly as they reach old age.

During the breeding season, which takes place in spring in the Northern Hemisphere, males migrate from polar waters to subtropical and tropical waters to compete for females. The heads of adult male sperm whales are often heavily scarred, indicating that fighting among males is intense. Many adult males have been observed with broken teeth and even broken jaws.

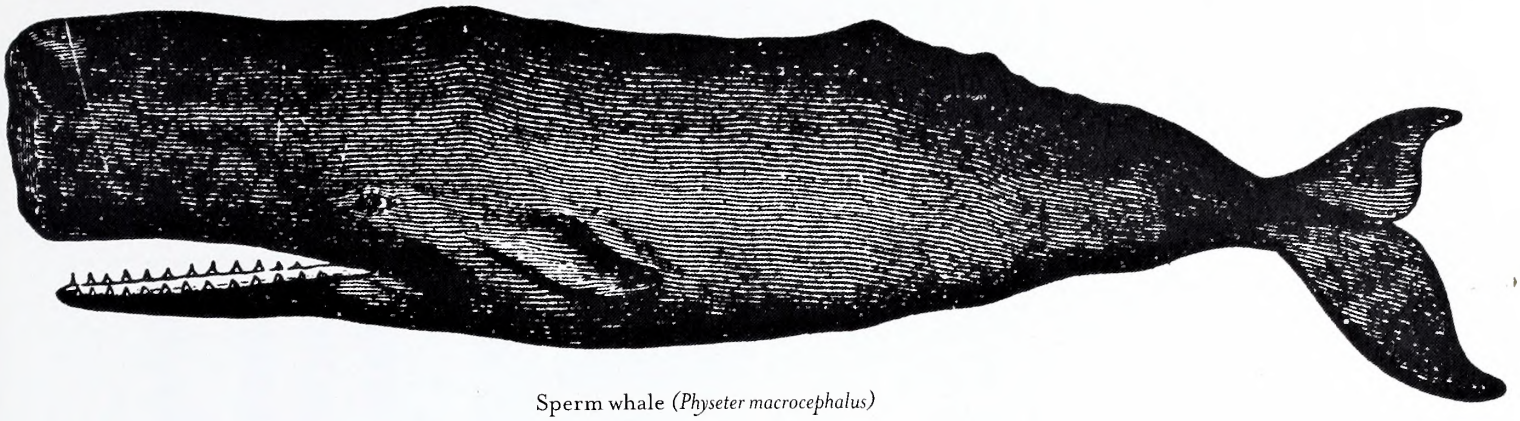


Artistic whalers etched sperm whale teeth with ornate designs known as scrimshaw.

Female sperm whales reach sexual maturity at around 10 to 12 years of age and typically give birth to a single calf once every four to six years. The gestation period of a female lasts over 18 months, and the calf is not weaned until well after 2 years of age. Sometimes a calf will nurse for many more years. Incredibly, whalers have discovered milk in the stomachs of sperm whales that were older than 13.

WHALES IN OUR WATERS

Off North Carolina I have encountered groups of female sperm whales with calves along the edge of the continental shelf in waters over 3,000 feet deep. It is likely that populations of female sperm whales are resident in the offshore waters of North Carolina.



Sperm whale *(Physeter macrocephalus)*

I have never encountered an adult male sperm whale off our coast, but they certainly occur here from time to time, as indicated by the stranding of Trouble off Wrightsville Beach in 1928. Another large male sperm whale was found floating dead in Hatteras Inlet in January 1987. This huge specimen measured over 60 feet in length and was estimated to weigh 60 tons, making it the largest male sperm whale ever recorded from the Atlantic coast of the United States.

Whaling took a heavy toll on sperm whale populations around the world. It is estimated that between 1800 and 1980, more than half a million sperm whales were slaughtered for their body oil and spermaceti. Today, despite the widespread destruction caused by commercial whaling, sperm whales remain the most common species of large whale, with populations numbering in the high tens of thousands. However, because of their slow maturation and low reproductive rates, sperm whale populations remain vulnerable to such things as pollution, entanglement in fishing gear and collisions with ships.

Another potentially more serious threat to deep-diving whales is the mid-frequency sonar used by naval military vessels. Marine mammal scientists have linked this sonar to several mass strandings of whales in many areas of the world, including North Carolina. A proposed U.S. Navy sonar training range that would occupy 500 square miles of open ocean off the North Carolina coast has caused alarm among environmentalists and scientists alike. How such sonar activities will affect the behavior of sperm whales and other species of whales and dolphins along our coast remains to be seen.

Sperm whales are truly remarkable animals in every sense of the word. Scientists have come a long way in understanding the lives of these mysterious denizens of the deep. No longer slaughtered for profit, sperm whales are now having the puzzles of their lives unraveled through benign research and careful observation at sea. Scientists are placing high-tech tags on the animals to record their daily movements, how deep they dive and how they communicate with one another. Underwater video cameras are even being placed on the whales' backs to give scientists unique whale's-eye views of their underwater environment.

I have been fortunate enough to observe sperm whales in such far-flung places as the Mediterranean Sea, Hawaii, the Bahamas, Mexico, near the sub-Antarctic island of South Georgia and in the waters of my home state. Each time I observe their blow in the distance or watch as they gracefully lift their tails high above the water before a deep dive, I am reminded of Melville's admiring words: "He is, without a doubt, the largest inhabitant of the globe, the most formidable of all whales to encounter; the most majestic in aspect. Hear ye! Good people all—the great . . . sperm whale now reigneth!"

Todd Pusser is a marine biologist and a frequent contributor to WINC.

A blowhole set on the left side of its head gives the sperm whale a distinctive blow that is discernable hundreds of yards away.

Small, feisty and abundant, the redbreast sunfish is just one of a number of species that comprise a group collectively known as panfish. The redbreast is found in most North Carolina river systems.

LUCKY 7 SEVEN

When scrappy panfish are your target, these lures can help bring fish to hand.

WRITTEN BY GERALD ALMY

PHOTOGRAPHED BY F. EUGENE HESTER

Largemouth bass have legions of devoted fans across North Carolina. Many other fishermen would put trout at the top of the list as the most challenging fish. Even catfish are gaining new, well-deserved respect among Tar Heel anglers.

But when you want to go out and simply have a fun day on the water without traveling a great distance or spending much money, it's hard to top that unpretentious group of finned critters collectively known as panfish. Bluegills are the most popular species, but the list also includes redbreast sunfish, redear sunfish (commonly called shellcrackers), fliers, longear sunfish, pumpkinseed, warmouth and rock bass. If you really want to broaden the category, you could throw in white perch, yellow perch, crappies and white bass.

Although panfish are often thought of as fun for novice anglers, the truth is they offer many attractions for experienced fishermen as well. Bluegills and their kin put up a powerful struggle on light tackle. Find a lake with panfish in the 3/4-pound to 1-pound range, and you'll enjoy some of the most memorable sport available in fresh water. Even the more typical half-pounders are strong enough to create a sharp bend in a thin graphite rod.

Not only are panfish fun to catch, but they're also found all across North Carolina in waters ranging from half-acre farm ponds and tiny creeks to deep-water impoundments and broad, sweeping rivers.

Don't have a lavish bass boat? Not a problem. Use a johnboat, canoe or float tube, or simply wade or fish from shore. You'll still be able to find and catch plenty of bluegills. And when you do, you'll discover another attribute of panfish: They're delectable. Fried, broiled, baked or poached, the flesh is firm, mild and scrumptious.

Panfish can be caught all year throughout North Carolina. In winter they often hold in deep water over structure such as humps, creek channel drop-offs, points or stump fields. In March, April and May, the fish head to shallower water for three reasons: The water is warmer there, food is more abundant and that's where spawning takes place. The fish swarm in thin water and are easy to catch, making springtime perhaps the most productive season for panfish anglers. When you find their favorite hangouts, landing dozens of fish is often possible at this time of year.

Cast to any cover you see, such as brush piles, rocks, grassy banks, points, logjams and weed beds, in depths of 2 to 6 feet. Concentrate on backwater bays, coves and the shallow ends of ponds. In rivers, fish slow pools, side eddies and sloughs off the main current.

As waters reach spawning temperature (around 65 to 70 degrees), focus on likely bedding areas with sand,

Although a johnboat is handy while fishing for panfish such as pumpkinseed, anglers also can find success wading or fishing from the bank.

clay or gravel bottoms. You can sometimes see the beds, which appear as 12-inch to 24-inch circles fanned out on the bottom. You might also see the fish themselves hovering suspended in large schools. Mating is often heaviest around the full or new moon from April through July.

If you can't find panfish schooling on beds, or if the spawn is finished as summer settles in, start looking in deeper water. Work 8- to 18-foot depths near structure such as drop-offs, ledges, humps and points. This is where most panfish will hang out during both hot and cold months. Don't ignore the shallows at dawn and dusk, when the fish often move into skinny water to forage near weeds, brush piles and grassy banks.

In the fall as waters cool, panfish will spend more time in those shallows throughout the day, instead of just at dawn and dusk. As water temperatures drop into the 50s and 40s, they'll gradually begin returning to deeper cover while winter marches in with its frosty nights and cold winds.

Most sunfish in North Carolina are caught on live bait. It's hard to beat a worm or cricket for steady action. Panfish also will eagerly grab rubber spiders fished top-water and nab wet flies and nymphs slow-crawled a few feet beneath the surface, making the fish superb targets for fly fishermen. These fish also respond readily to the angler tossing ultralight lures.

After years of fishing for these diminutive fish with a variety of artificials, I've found that seven offerings have consistently yielded the best catches for me. Here's a rundown on these top lure choices and how to fish them.

1 **GRUBS.** A leadhead jig of 1/64-ounce to 1/8-ounce with a soft plastic body is unquestionably the single-most productive panfish lure of all. With their small mouths, sunfish prefer a compact lure that looks like an aquatic insect, and this offering, which is subtle and not flashy, fits the bill.

A grub's chewy, pliable texture also encourages fish to hold the bait longer, making hook-setting easier. These soft plastic lures hold scent well if you want to add extra olfactory appeal, or you can go with offerings that come scent-fortified straight out of the package.

The best grub tails for bluegills and shellcrackers are short and stubby — either single or split. Fluttering curly tails are more minnowlike in appearance, and bluegills simply don't feed on baitfish that much. Those longer twister tails are good, however, for yellow perch, white perch, rock bass and white bass. Top colors include pumpkinseed, motor oil, smoke, chartreuse, orange, white and black. The entire lure, including the jig head, should be an inch or less in length for bluegills, up to 1 1/2 inches for the species with larger mouths.

A slow, steady retrieve works best, although pausing occasionally can help at times, particularly in deep water. If you really need to slow things down, put a bobber on the line so you can suspend the lure as you inch it back.

2 **SPINNERBAITS.** Although the plain grub is usually best, sometimes the same basic lure rigged on a safety-pin spinnerbait frame, such as the famous Beetle Spin, is a better bet. This gives a slightly larger offering, and the small Colorado spinner adds a bit of flash. That can be helpful when the water is murky and also when the fish are in an aggressive mood.

Though a straight, steady retrieve at a snail's pace is usually best, sometimes a stop-and-go presentation works well. Cast out and let the spinnerbait sink to the bottom or close to it, then begin a smooth retrieve. Halfway back, or when you come near deeper water, a log or a weed bed, pause suddenly in your retrieve. The fish will often nail the small, flashy lure as it drops down, imitating a wounded minnow or struggling crustacean.

3 **SPINNERS.** Another top choice for cloudy water or actively feeding fish is a plain spinner. Some I've had good luck with include the Mepps, Blue Fox, Panther Martin, Worden Rooster Tail and Luhr-Jensen Shyster. Spinners come in all kinds of shapes, sizes and colors. Choose small models and stock a variety of blade colors, including silver, gold, black and even a couple of painted, bright fluorescent hues for murky water conditions.

Retrieve spinners at a slow, steady pace, reeling just fast enough to get the blade revolving. Unlike most lures, these offerings do not imitate anything in nature, but they often can trigger belligerent strikes.

4 **CRANKBAITS.** It may seem strange to be tossing crankbaits for bluegills, but in the tiniest sizes offered, these are good additions to any well-stocked panfish tackle box. These are fun to fish, since you can work them a bit faster than most other types of lures, and the pint-sized fish slam them violently. Some models I've enjoyed good success with include the Rebel Creek Creature, Cat-R-Crawler and Crickhopper. These offerings are effective for two reasons: their enticing wiggling action and the fact that they mimic common bluegill foods.

If there is one drawback to fishing the miniature crankbaits for panfish, it's the standard double treble hooks. These can make it difficult to unhook your catch, and they increase the chance of serious injury to the fish. There are two solutions. You can replace the treble hooks with a single hook or flatten the barbs with pliers. If you replace the trebles with single hooks, try to get a size hook that balances the lure well, and test it to make sure the action is still enticing before heading out to the water.

5 **CAROLINA-RIGGED PLASTICS.** You've probably used this setup for bass, but Carolina-style rigging also offers a very productive way to catch bluegills and other panfish. Rig a small sliding or egg sinker (1/8-ounce to 3/8-ounce) ahead of a barrel swivel and bead, with the lure trailing 18 inches to 36 inches behind. Alternately, you can simply use one large round split shot ahead of the offering.

For the lure, a good choice is a thin plastic worm in the 2-inch to 4-inch range with prerigged hooks or a single exposed hook. Another option is a thin grub, hooked lightly through the head, just 1/8-inch from the tip, on a size 6 to 10 short-shank bait hook. Having the lure separated from the sinker and fluttering almost weightlessly behind makes this setup especially appealing to fish on heavily pressured waters and clear lakes. But be prepared—you might latch onto a 5-pound bass as readily as an 8-ounce bluegill.

6 **SOFT-PLASTIC INSECT IMITATIONS.** Some of these fake "bugs" are so realistic you'd swear they might crawl or hop away. They often are impregnated with scent, but you can add your own with a dip or spray bottle.

Some insect imitations come pre-rigged, others you simply thread onto a size 6 to 10 hook. Add a split shot or two for weight, and cast to likely cover or drift through back eddies and slow pools on streams and rivers. At times adding a float 2 feet to 5 feet above the lure is helpful, because it lets the offering hang temptingly next to the fish. If no strikes come, twitch once, pause for a few seconds and then slowly retrieve the offering.

Their soft feel and realistic appearance makes fishing with these lures a handy way to use "bait" without the bother of capturing and keeping the real thing. As an alternative rigging, you can thread the plastic insects onto a small leadhead jig in place of a regular grub body.

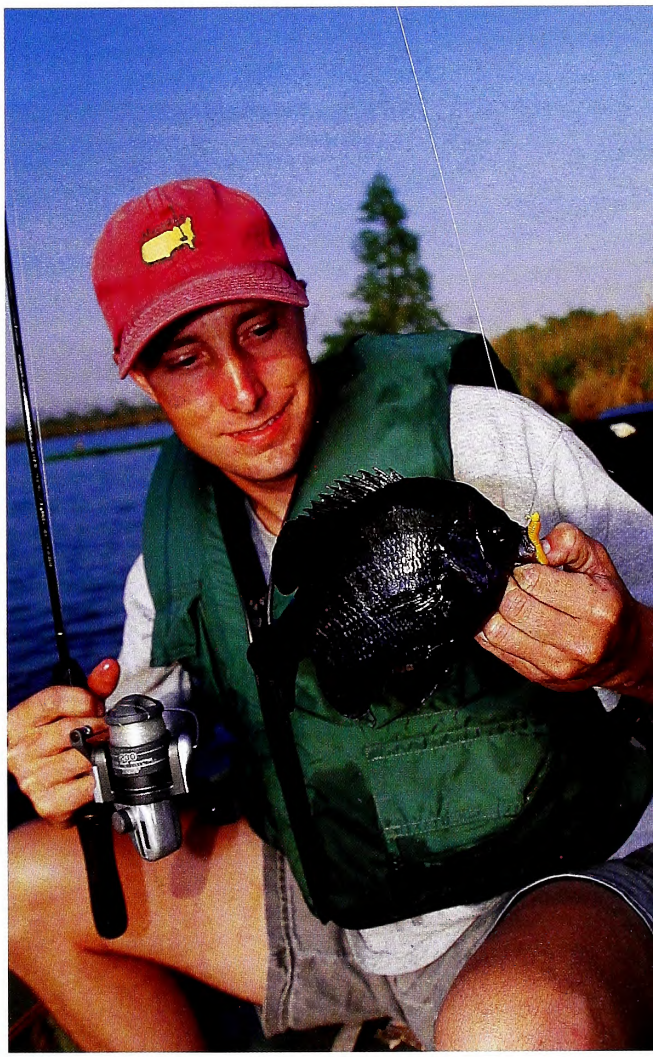
7 **SPOONS.** Small versions of these wobbling chunks of metal can be excellent choices for bluegills and other panfish in both lakes and rivers. Cast to cover or eddies in streams and retrieve just fast enough to make the spoon undulate seductively. Silver, gold, green and black are the best colors, with 1 inch to 1 1/4 inches a good length.

For fish holding in deep areas, slab-type spoons that have little or no curve built into the body are excellent choices. These offerings should be vertically jigged. For fish in winter and in summer after spawning is complete, position yourself above the quarry or likely looking structure in deep water. Lower the spoon to the appropriate level and jig it slowly and rhythmically up and down, with pauses between the lifts. Most fish will strike on the drop, so be sure to lower the lure just fast enough that it can flutter down freely while keeping excessive slack out of the line. If a bluegill is nearby, a thumping take is almost guaranteed.

Finally, let's talk tackle. A 5- to 6 1/2-foot light-action rod coupled with an open-faced spinning reel with a smooth drag and 4-pound to 6-pound line is perfect for almost all panfish. In some cases you can also use a cane pole or fly rod effectively to reach out and dap grubs or insect imitations next to cover and tussle with fish up close.

Gerald Almy lives in Virginia and is a frequent contributor to Wildlife in North Carolina.

Light tackle is a key when chasing panfish. Jerry Richardson landed this bluegill (bottom) with a spinning rod, but a fly rod can be deadly, too, as evidenced by this stringer of warmouth.



Just South of HEAVEN

Written by Bruce Ingram

"Wait a second, I just heard a Carolina wren and need to check it off," I called to Kevin Hining.

"No problem," Hining replied, even though it was the third time in the first 15 minutes of our float down the South Fork of the New River that I had asked him to stop paddling and wait for me. First I had asked him to beach our canoe so I could capture on film the image of our craft, the clear water of the South Fork, and the mountains and blue sky of Alleghany County in the background. Then a riffle with several boulders as current breaks appeared, and I just had to stop to wade-fish the area.

The South Fork meanders northward through gorgeous scenery.

FISHING, CANOEING, BIRDING, CAMPING AND MORE: THE SOUTH FORK OF THE NEW RIVER

MAKES AN OUTSTANDING OUTING FOR ALL TYPES OF OUTDOOR ENTHUSIASTS.

Hining was willing to cease paddling whenever I requested because he is just as enamored with this daughter of the Mississippi as I am. Hining's passion is understandable also because he is an N.C. Wildlife Resources Commission fisheries biologist for this highland river in the northwest region of the state.

"Canoeing and fishing the South Fork of the New River is always appealing to me, especially when I am able to go with my wife, Staci," Hining said. "The South Fork is one of the state's most accessible rivers, and it is also one of the best for couples and families to paddle."

One thing that makes the South Fork so accessible is the presence of the New River State Park, located in Ashe and Alleghany counties. Two access points exist on the South Fork, and there is one on the Main Stem of the New after the South and North forks commingle. The first of these is the Wagoner Road Access Area, which is situated at river mile 26, southeast of Jefferson.

The second is the U.S. 221 Access Area, located at river mile 15, northeast of Jefferson. And the last is on the Main Stem, the Alleghany County Access Area at river mile 1, which is reachable only by canoe. All of these access points offer camping facilities. A fourth state park access point offers parking and an access area right across from RiverCamp USA at Kings Creek Road. Of course, a number of other access points also exist (see accompanying map).

The river mile terminology comes from an action taken by the N.C. General Assembly on May 26, 1975. That's when the last 22 miles of the South Fork and the first 4.5 miles of the Main Stem, to the Virginia state line, were designated as a State Scenic River. The Secretary of the Interior and Congress later designated this 26.5-mile section as part of the National Wild and Scenic River system. A major reason for creating the designation was to prevent a dam from being built. The legislative actions forever prohibit construction of dams and reservoirs on this section.

Another reason for the river's accessibility is the general lack of major rapids, maintains Jed Farrington, who operates Zaloo's Canoes in Jefferson. "The South Fork has mostly Class I rapids, with a few easy Class IIs," says Farrington. "In fact, all of the day trips we offer have nothing more than Class Is and riffles. And a lot of family, church and scout groups that want to go on overnighters find the state park access points convenient places to camp out.

"I am also seeing more and more birders taking canoe trips on the South Fork. I think the birders appreciate the great scenery on the South Fork, just as the other user groups do."

The South Fork joins the North Fork in Alleghany County to form the New River.

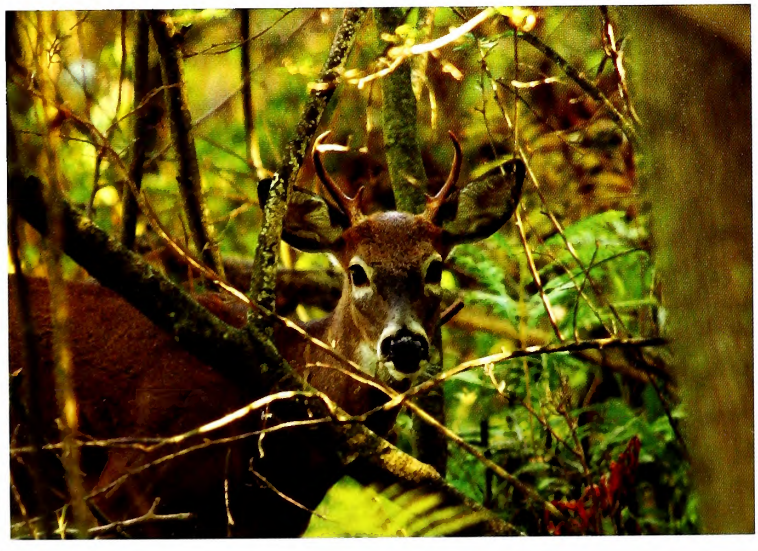
The South Fork of the New is indeed a marvelous stream to bird. Hining and I spent two mid-July days floating the river, and we heard or saw 43 avian species — outstanding considering the time of year. A major highlight occurred when we flushed a jake (a juvenile gobbler) that was feeding in a field adjacent to the river. Our canoe passed too close to the unsuspecting turkey, and he flew across our bow to the other side of the waterway.

Warbling vireos are absent from most of the Tar Heel State, but this species is more abundant along the South Fork than just about anywhere else in North Carolina. When I heard the trills of the warbling vireo on our second morning, I eagerly pointed out the bird's location to Hining. Three relatives of the warbling vireo — the red-eyed, white-eyed and yellow-throated vireos — also dwell along the river, and we added them to our trip checklist.

The South Fork is a wonderful place to watch warblers, especially during April and May, when the spring migration occurs. Even on our midsummer outing, Hining and I were able to identify hooded warblers, common yellowthroats and American redstarts. In birdwatcher's terms, other "good" birds included scarlet tanagers, Eastern kingbirds, Acadian flycatchers, wood ducks, great crested fly-

From left: White-tailed deer are plentiful along the river corridor, canoe camping is fun and easy, barred owls make their homes there, and smallmouth bass fishing is great.

PAUL CALHOUN



PAUL CALHOUN

BLACK HORSE STUDIO

ONE THING THAT MAKES THE SOUTH FORK SO ACCESSIBLE IS THE PRESENCE OF THE NEW RIVER STATE PARK.

catchers and broad-winged hawks. On our second day, Hining and I spent five minutes trying to determine if the sounds we heard emanating from a blackberry thicket were a brown thrasher or a gray catbird mimicking a thrasher. Finally some catlike mewing came from the copse, and the male catbird emerged.

As much as I enjoy birding the South Fork of the New, I could not visit the river without fishing it. On my most recent excursion, my best smallmouth was a 15-inch beauty, and Hining and I caught and released three smallmouths in the 12- to 13-inch range, along with a number of bronzebacks in the 8- to 11-inch range. We also tangled with rock bass and redbreast sunfish, and the fisheries biologist landed a single pumpkinseed sunfish.

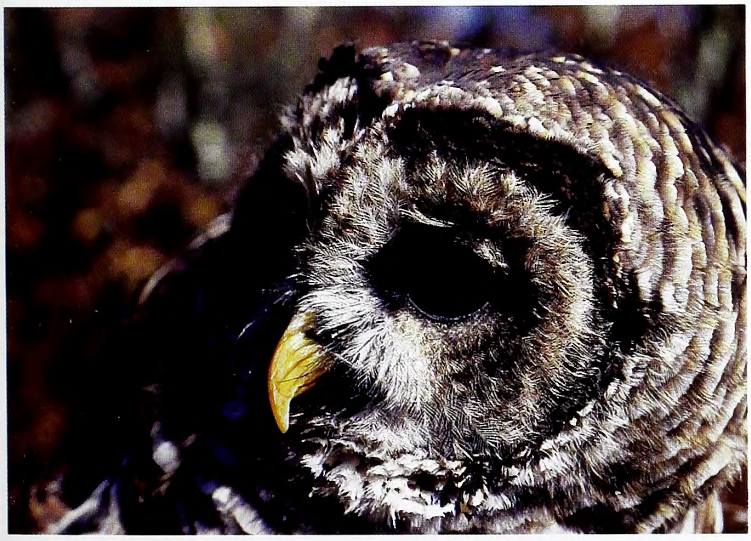
"One of the things I try to impress upon families and scout groups planning to float the South Fork for the first time is to bring their fishing rods with them," Hining said. "The river has a lot of smallmouth bass and rock bass and a few redbreast sunfish. On our fishing surveys, we have even found a few flathead catfish in the 1- to 3-pound range, plus some muskies."

The South Fork features classic river smallmouth habitat. Deep-water ledges dot the river, often below riffles and Class I rapids. Current breaks, typically in the form of huge boulders and the occasional rock garden, exist in many places, as do eddies, water willow beds, rock-laden pools and patches of elodea. Boulders and water willow beds in the foreground and the surrounding hillsides in the background offer marvelous photo ops for outdoor photographers, whether during the spring bloom or the peak of fall color. Of course, some South Fork sojourners may want to simply canoe the river, and these individuals — with overnight stops at the state park lands — can easily paddle the scenic river section in two or three days.

"You know, there's something to be said for someone being able to canoe a river the size of the South Fork without having to portage around a dam," says Hining. "I would guess the South Fork is probably one of the largest rivers in North Carolina without a dam. When you add the mountains, rolling hills, meadows and wildlife found along the river to the paddling experience, well, I think canoeists will be most pleased with their time on the water."

Unfortunately, as much as I relish my visits to the South Fork of the New and enjoy singing its praises, I must report that the

BRUCE INGRAM



BRUCE INGRAM

PAUL CALHOUN

BRUCE INGRAM

Keeping riparian buffers wild helps prevent pollution caused by the erosion that too often follows streamside development.

stream increasingly suffers from a sedimentation problem. In recent years the South Fork has become more and more popular as a place for people to build homes, and many of these structures have been built very close to the bank. This practice can cause erosion and make a house more susceptible to flood damage.

But what really is having a negative impact on the South Fork, Hining said, is the tendency of developers and property owners to clear all trees and brush from along the river so that homeowners can have unobstructed views of the waterway. This destruction of the riparian zone is a major reason why some banks have become exposed and even collapsed into the river.

As we were paddling down the river, the biologist repeatedly pointed out problem areas. For example, one person had built a home within the floodplain and had totally destroyed the riparian zone along the shoreline. As we paddled by, the homeowner had just finished mowing several acres of his new lawn and was busily spraying his yard for weeds.

"The chemicals from the sprayer and the bank for the lawn are all just going to wash right into the river the next time we have a few hard rains," Hining said. "I'm sure that man doesn't know what he is doing is harmful to both his property and the river. He just thinks he is keeping the riverbank neat."

Fortunately, an organization exists that is trying to educate the public on how to avoid harmful practices. Eric Hiegl, stewardship director for the National Committee for the New River, deals with education and outreach issues. "Most landowners along the South Fork want to do the right thing for the river, but they just don't know how," Hiegl said. "That's why we spend so much time attempting to educate people on how to be good stewards of the land and the river." (See sidebar.)

One of my wife, Elaine's, and my favorite people we have met on our visits to the South Fork of the New is Tom Burgiss, who operates the Burgiss Farm Bed and Breakfast in Laurel Springs and has spent most of his 73 years living near the river. When I stopped by the B&B after Hining and I had completed our second day on the South Fork, I asked Burgiss what the South Fork meant to him.

"The South Fork is sort of the thread that holds this area and its people and history together," Burgiss told me. "When two of my boys were 14 and 15, I dropped them off on the riverbank with a canoe, tent, sleeping bag and food and told them that I would see them in three days downstream. My goal was to have them develop some independence and self-reliance."

Today, the South Fork is still a place where young people can develop these qualities. Just as important, the river is also a destination for anyone who savors birding, fishing, paddling and other outdoor pursuits. ◆

Bruce Ingram is a freelance writer living in Virginia. He contributes regularly to a number of outdoors-related publications.

BRUCE INGRAM

NEW RIVER State Park

IF YOU GO

CANOE RENTAL AND STREAM CONDITIONS
Zaloo's Canoes in Jefferson, (336) 246-3066 or 1-800-535-4027, www.zaloos.com

LODGING
Buffalo Tavern Bed and Breakfast in West Jefferson, 1-877-615-9678, www.buffalotavern.com

Burgiss Farm Bed and Breakfast in Laurel Springs, 1-800-233-1505, www.grapestompers.com

Doughton-Hall Bed and Breakfast in Laurel Springs, (336) 359-2341 or 1-888-799-5194, bandb@doughtonhall.com

TOURISM AND INFORMATION
Alleghany County Chamber of Commerce in Sparta, (336) 372-5473 or 1-800-372-5473, www.sparta-nc.com

Ashe Co. Chamber of Commerce in West Jefferson, (336) 846-9550 or (888)343-2743 www.ashechamber.com

RESTAURANTS
Landing Restaurant in Jefferson, (336) 982-7378 or 1-888-292-2310

Nikola's Restaurant and High Meadows Inn in Roaring Gap, (336) 363-6060 and (336) 363-2221, respectively

The Bluffs Coffee Shop at Milepost 241 of the Blue Ridge Parkway, (336) 372-4744

The Senator's House in Sparta, (336) 372-7500

STATE PARK
New River State Park in Jefferson, (336) 982-2587, www.ncsparks.net/neri.html

CONSERVATION
National Committee for the New River in West Jefferson, (336) 246-4871, www.ncnr.org

Source: N.C. Department of Environment and Natural Resources

MAP BY KRISTIE RHODES

FOUR GOALS OF THE NATIONAL COMMITTEE FOR THE NEW RIVER (NCNR)

1 | LAND PURCHASE AND CONSERVATION EASEMENTS

"We have purchased or placed under easement some 1,700 acres along the South Fork and New River in North Carolina and Virginia," says NCNR stewardship director Eric Hiegl. "We are currently working on purchasing more land and obtaining conservation easements on other properties. All of this has been done and is being done with 100 percent cooperation of the landowners.

"We want to keep the family farm a family farm, instead of seeing the land turned into subdivisions. Conservation easements are a great way to protect the family farm, as there are many tax benefits when a farm is placed under an easement."

2 | RESTORATION WORK

Hiegl reports that the NCNR spends a great deal of time helping landowners restore riparian zones. The organization can assist landowners in selecting the best species of trees and bushes to replant along the South Fork.

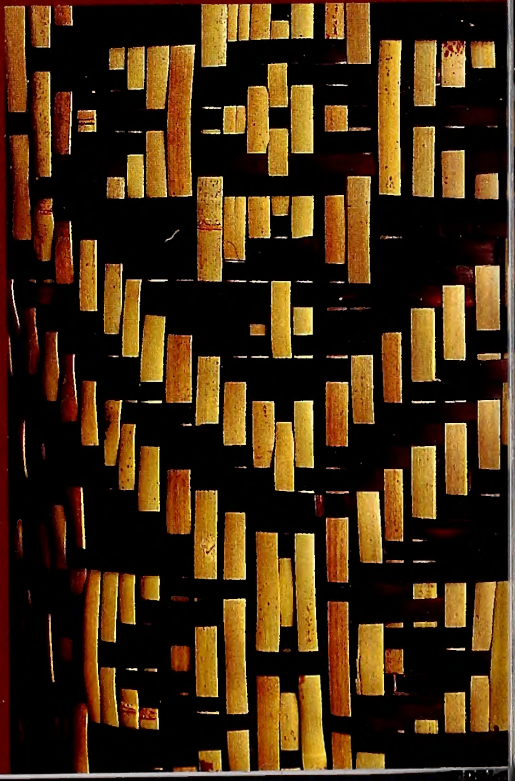
3 | ADVOCACY WORK

The NCNR tries to involve itself in local issues pertaining to the New River watershed.

4 | WATER QUALITY MONITORING

"We monitor and record the water quality of the river, so that we can track changes that might occur," says Hiegl. "That way, if something bad does take place, we have a baseline record of how the New used to be."

RAISING CANE



EFFORTS TO RESTORE RIVER CANE HAVE ATTRACTED DIVERSE GROUPS INTERESTED IN PRESERVING A NATURAL RESOURCE. FOR THE CHEROKEES IT'S ALSO A MATTER OF MAINTAINING THEIR CULTURAL HERITAGE.

To scientists the restoration of river cane is a matter of preserving natural resources. To Cherokee artisans it's much more than that. River cane (*Arundinaria gigantea*, also known as giant cane and switch cane) is a member of the bamboo family that once grew in profusion throughout the southeastern United States from the Ohio River Valley to Texas and Florida. In the mountains of western North Carolina, every Cherokee village had its canebrake.

"That's how a lot of archaeologists identify village sites," said Davy Arch, a Cherokee artisan with the Qualla Arts and Crafts Mutual, a co-op in Cherokee. "They look for the cane and then kind of go from there."

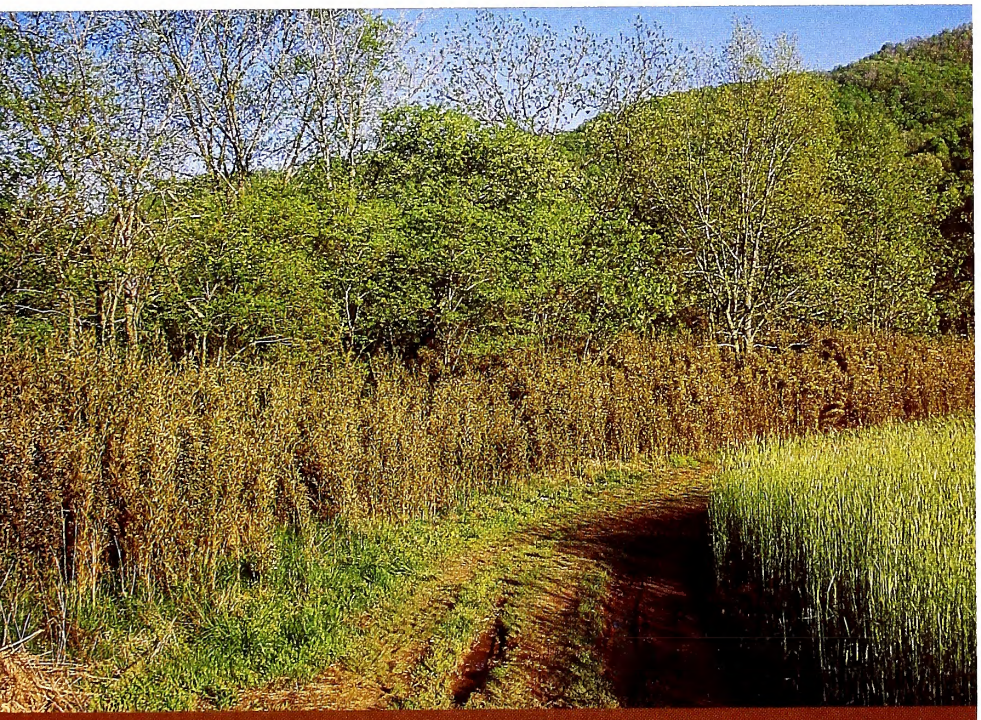
The Cherokee cut cane for various uses and burned cane fields to encourage greater growth. "We used it for everything," Arch said. "We ate it, built everything we used out of it, built our houses out of it. The insides of the old houses were lined with river cane mats, so the inside of your house looked like a huge cane basket. They'd use the seeds and make flour out of it, like wheat flour. And it's good fodder for livestock."

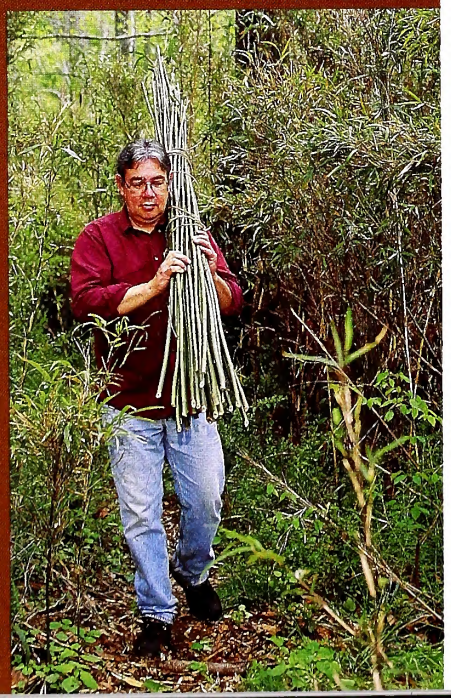
After Europeans brought diseases that devastated the Cherokee — nearly half the population was killed in one 1738 smallpox outbreak alone — the cane may have become even more abundant for a while. "After the big die-off of the population, the farmlands were abandoned and the river cane just encroached. A lot of [former] agricultural fields became these big canebrakes," said Dennis Desmond of the Land Trust for the Little Tennessee.

written by BILL McGOUN ❖ photographed by MELISSA McGAW

That was only a temporary situation. Perhaps the devastation wrought by British troops who ravaged the Cherokee homeland during the French and Indian War also helped destroy the canebrakes. For whatever reasons, cane had become rare in the mountains by the late 19th century, according to anthropologist James Mooney. "Most of the cane now used by the East Cherokee for blowguns and baskets is procured by long journeys on foot to the streams of upper South Carolina, or to points on the French Broad above Knoxville, Tenn.," Mooney wrote near the turn of the 20th century.

If anything, the situation grew worse in the 20th century. According to Arch, a number of factors came into play. "There were several small hydroelectric plants up and down these rivers that are gone now. And when they started building modern roads, they started straightening out the creeks, started developing the creek banks. Then the commercialism hit, with the campgrounds. That really did away with a lot of the useful bottomland. And before that, agriculture. Everybody needed every square foot to raise tobacco, corn, something to feed the family with."





Cherokee artisan Davy Arch harvests some culms from a canebrake in Swain County. Arch is involved in the effort to restore river cane in western North Carolina.

HELPING THE CANE

Nationally, river cane today is reduced to perhaps 3 percent of its natural extent. But thanks to a confluence of interests, the situation may be changing. Money for restoring cane is coming from the Cherokee Preservation Foundation, a charity financed by profits from Harrah's casino at Cherokee. The lead agency is Revitalization of Traditional Cherokee Artisan Resources (RTCAR), though many other people are involved.

David Cozzo, project manager for RTCAR, explains, "We're put together through Cherokee studies at Western Carolina University [WCU]. I'm actually an employee of WCU. We're trying to bring in a wide range of groups that can work together on these issues." Among the groups involved in the project are the Land Trust for the Little Tennessee, Qualla Arts and Crafts Mutual, Appalachian Heritage Alliance, University of Tennessee, University of Georgia and N.C. State University. "The [WCU] Division of Geosciences and Natural Resource Management is developing a river cane research station, which is the only thing like it in the country," Cozzo says.

One reason so many people are involved is because there is a lot to learn. There still is considerable uncertainty about many aspects of river cane, ranging from its reproductive cycle to its habitat preferences. Even its precise identity is in question. Cane plants grow from underground roots known as rhizomes for an undetermined period, after which the stalks, known as culms, produce flowers and seeds and then die. "Some reports suggest synchronous flowering after periods ranging from 3 to more than 50 years, followed by die-offs of entire stands," Steven G. Platt of Clemson University and Christopher G. Brantley of the U.S. Army Corps of Engineers wrote in *Castanea*, the journal of the Southern Appalachian Botanical Society. "However, others found flowering to be unpredictable. Seed dispersal has not been documented."

Canebrakes typically grow along stream banks. "It likes the moisture, but it doesn't like to have its feet wet," Desmond explains. "It's a great plant for revitalizing riverbanks. It's probably not that well studied, its role in

Larger culms of river cane, about an inch in diameter, are used by the Cherokees to make blowguns.

flooding." How effectively cane will grow in other areas and its effects on in flooding are among the unknown factors.

In theory, the type of harvesting practiced by the Cherokee is the best way to keep canebrakes in shape. "They're quite particular, which is good," Desmond said. "When they do a harvest, it's more of a selective harvest. They're not going to cut down the whole cane. It's a very sustainable way to manage."

On the other hand, there may be benefits to clear-cutting, as Arch has observed. "I took a lady to the canebrake and showed her where some pretty good cane was at. She took her son back and clear-cut it," he said. "The first year some little pencil-thin sprouts came up. The next year there were some culms big enough to make blowguns out of. But they didn't get very tall; they were real bushy. The third year it put off some really tall culms. So clear-cutting or burning off might be a way to foster better growth from the rhizomes."

BAMBOOZLED

"There's the whole issue of how many species of cane there really are," Desmond said. "Down along the coast, they call it switch cane. Here it's called giant river cane. Some people say it's all one species; others say there are different species if not different varieties (See "Amazing Cane," March 2003). And here you [see] the mountain cane or dwarf cane in the upland woods. It doesn't get more than 2, 3 feet tall. Is that the same cane, where it's just on a drier site?"

The environmental benefits of river cane are many. A canebrake filters sediment and chemicals from runoff, and its thick root system holds soil in place. Cane provides fodder for cattle, horses and hogs and habitat for deer and turkeys. Some species of butterflies, such as Creole pearly eye butterfly, are dependent on cane. Other animals, including Swainson's warblers, also use cane habitat.

Although the Cherokee are interested in the environmental aspects of river cane, they have other priorities, too. A dependable, convenient supply of cane is important to their efforts to preserve traditional basket making. According to Arch, "River cane basketry is probably one of the oldest fine art forms in our culture, as far as pattern development, the mathematical equations that it takes to build that basket. We've seen some examples of basketry out of cane way, way back, thousands of years ago."

NATIONALLY, RIVER CANE TODAY IS REDUCED TO PERHAPS 3 PERCENT OF ITS NATURAL EXTENT. BUT THANKS TO A CONFLUENCE OF INTERESTS, THE SITUATION MAY BE CHANGING.

Like so much of American Indian culture, crafts suffered under the relentless pressure upon the societies to abandon their traditional practices, whether such pressure was applied intentionally through forbidding students to speak their native languages or unintentionally through the requirements of survival amid the outside culture. Today there are no more than 30 river cane basket makers among the Cherokee, according to Arch.

Classes at the Qualla Mutual are changing that, however. "Over the last couple of years, we've probably trained 20, maybe 30, people that can make a double-weave basket now," Arch said. "That's almost a lost art form. We've got about five or six of them that are making them on a regular basis. Several students have been able to join the co-op after learning how to weave baskets in these classes. So the classes have been a really good thing for the artists and the co-op.

"It was getting down to the point where everybody was depending on just a few people to carry the load. When a couple of those ladies died real close together, they realized how urgent it was to get something going to preserve some of these art forms before they totally disappeared."

One Saturday, nine women were seated in a circle at the Qualla Mutual, cutting lengths of cane into the strips that are used to make baskets. It is a daylong task, the second of four activities involved in making a basket. It's a very labor-intensive process. "If [the culm] is about the size of your finger, you can get four splits off of it, but if it's the size of a blowgun, about an inch in diameter, you can get eight

splits off of it," Arch said. "And you'll quarter it and then peel off the outside layer, and then you have to scrape it on the inside to get it thin and flexible enough to work with. To make 100 splits for a professional like Lucille [Lossiah] in here, it would probably take her a good day's work, maybe six or eight hours anyway.

"If you're as proficient as Lucille or some of the other professionals that have been doing it all their lives, she could produce a small basket in a few days from start to finish. You take about a day's work in harvesting the material, another day preparing the splits, then another day dyeing the material. So you've got three days in preparation. If she had all her materials sized and ready, she could sit down and maybe within a day create a small double-weave. So you're talking about 40 or 50 hours in a basket. It'll take me two weeks to make that same basket."

Large baskets, the size of a wastepaper basket or larger, can take several weeks, even for an expert. For one thing, the maker needs strips at least 8 feet long, and those can be hard to find when the plants generally grow no taller than 12 feet. The surge in demand for authentic crafts makes the effort worthwhile, however. Arch said a large basket can fetch a price into the thousands of dollars.

Making a blowgun from cane also is a multistep process. "You have to straighten it first," he said. "There is a real art in straightening it. You heat the cane in the fire; while it's hot, it's flexible. You can bend it, straighten it out, then hold it until it cools. Traditionally they used an arrowhead on a long stem, reamed it out. Then they'd run sand through it and just basically sand it, using river sand and a long stick.

"One of my favorite tools, nowadays, I made out of the piece of steel that runs around the edge of an old set of box springs. [You] heat and bend the end of it, flatten it out and make a drill bit out of the end of it [to] cut through those sections. Once I cut it out, I've got a rasp on the end of a long rod I use to smooth it out with. To make tools like a rasp, cut a strip of a coffee can, punch holes in it with a nail, then wrap that around a stick."

ALTHOUGH THERE ARE A FEW SMALL STANDS OF CANE NEAR CHEROKEE, SUCH AS THE ONE THAT HAS GROWN UP AT THE GATEWAY INTERCHANGE ON U.S. 74, MANY ARTISIANS STILL OBTAIN CANE FROM THE LOWLANDS, SOMETIMES TRAVELING AS FAR AS KENTUCKY.

David Cozzo works through Western Carolina University to restore cane.

CANE IN THE LANDSCAPE

Although there are a few small stands of cane near Cherokee, such as the one that has grown up at the Gateway interchange on U.S. 74, many artisans still obtain cane from the lowlands, sometimes traveling as far as Kentucky. The efforts of RTCAR and others are aimed at changing that, among other things. Cozzo explains what his project is doing at Kituwah, an important Cherokee site 7 miles west of Cherokee proper: "The situation over here [at Kituwah] is we put in a butternut orchard. Across the eastern United States now, the butternut [suffers from] blight. We've lost about 80 percent of the butternut. So the University of Tennessee tree program came over, and they put in a butternut orchard. We noticed that the walnuts and the butternuts and the cane seemed to thrive together. What we're doing is we're letting the natural cane that is down there [by the Tuckasegee River] grow out into the orchard, and we're hoping it will protect the trees, also letting the trees grow up and reach for the light.

"We are hoping to see how the two actually do together. Both are valuable to the basket makers. The butternut's a dye plant. The cane is the signature basket-making material of the Cherokee. It's the primary traditional basket material." RTCAR also is trying to help Cherokee artisans use cane grown on privately owned land. "We're trying to figure out a protocol to develop an understanding with the landowners and the cane harvesters, the Cherokee," Cozzo said. "How can they work together? What would make a landowner comfortable? What would a harvester have to do to get his resource?"

This could be a moneymaker for the landowner, Arch said. "Some people that harvest it have been able to get as much as a dollar a stick for it. On the average you can get about 20 cents or a quarter. So it is something that people that have enough area could actually grow it, like Christmas tree farming. If they could have a long-term strategy and develop a relationship with artists that need it, then they could have a real money crop there." In the past, he said, cane often would be obtained on a barter basis. "You know, trade a basket for cane and things like that. There's been a long-standing history of us dealing with landowners in the past to get the resource."

With the Land Trust for the Little Tennessee, the primary issues are water qual-

To make baskets, cane must be pulled into strips and scraped to make it thinner and more pliable. An artisan such as Lucille Lossiah might need a week to make even a small basket.

ity and wildlife habitat, Desmond said. Part of the effort is managing stands of river cane on the 64-acre Tessentee Farm preserve south of Franklin in Macon County. "We harvested [there] last year, about 300 culms, and used them in a basket class here at Qualla," Arch said. "We're experimenting with percentages, what you can take out of a brake and keep it healthy. We're talking about a prescribed burn. Dennis has got it in the works." Again, the river cane is not considered in isolation. "Having a conflation of trees and river cane is probably your best thing," Desmond said. "It has such a dense root, it really holds that top layer [of soil], and then the trees are going to hold that subsoil in place."

Another reason to encourage river cane is as part of ecotourism, Arch said. "Recently I worked with the John C. Campbell Folk School [in Cherokee County] and did some artwork for the river cane walk they've put on their campus. The Corps of Engineers came in way back straightening the creek out. Now they've come back and made it crooked. When they did that, they decided to put an attraction on the lower end of the campus down there to get the students to use those bottoms." And for some people, cane makes an attractive planting. "Over a 5- or 10-year time period it'll spread thick enough that you can manage it along the edge of your yard just by mowing off the young sprouts," Arch said.

Cozzo sees the initiative as a model that others can follow. "There are other Native American groups that are dealing with resource issues, like us," he said. "We're hoping this is something that will demonstrate how to keep a culture and an environment intact." River cane may be somewhat of a botanical mystery, but it satisfies the needs of a lot of people for different reasons. And that means its future is a lot brighter than its recent past.

Bill McGoun is a retired journalist who holds a Ph. D. in anthropology from the University of Florida.

A HIGHLAND MISCELLANY

Meet a few of the anglers who have helped create, nurture and preserve the fly-fishing traditions of western North Carolina.

written by *Jim Casada*

Mine was an incredibly rich boyhood. From the age of about 12 until the time came to leave home for college, I averaged 100 days or more each year fly-fishing for trout. Two streams in the Great Smoky Mountains National Park, Deep Creek and its major feeder, Indian Creek, flowed within walking distance of my home. My childhood world was filled with devoted anglers and imbued with the deep-rooted traditions of mountain fly-fishing. Some of the fishing heroes of my marvelously misspent youth served as informal mentors, and tales associated with the sport's mountain history were almost daily fare.

Today ours seems a world that runs at a pace so quick that little time remains for tradition, storytelling and respect for the past. Yet those of us who cherish fly-fishing in western North Carolina should pay careful heed to the lure and lore of the sport's history in our state. With that thought in mind, let's take a look back at some of the endearing individuals and enduring traditions of the sport. These fishermen and their feats run like bright threads through the fabric of high-country sporting history.

ILLUSTRATION OF TROUT FLY BY ADRIENNE GRUVER

PHOTOS.COM

WILLIAM T. ROLEN JR.

JIM CASADA

JIM CASADA

(Above left, clockwise) Levi Haynes, Allene Hall, Dwight Howell, Marty Maxwell and Bennie Joe Craig each played a role in the rich heritage of Smoky Mountain fly-fishing.

Without question Mark Cathey, who died in 1944, must be reckoned the best known of all North Carolina fly-fishermen. At a time when most anglers favored two or three wet flies fished in tandem, he worked magic with his "dance of the dry fly." A confirmed bachelor, "Uncle Mark" devoted his life to sport. By all reports, seeing him twitch the end of his rod to give his favorite pattern, a Gray Hackle Yellow, the appearance of a living insect was something to behold.

However, it was the next generation of men, those in their fishing prime during the middle years of the 20th century, that really witnessed innovations in fly-tying and the growing popularity of the dry-fly approach. It was during this period that Cap Wiese, the headmaster of Patterson School in Lenoir, was catching big trout with his Sheep Fly, along with helping a fledgling conservation organization, Trout Unlimited, gain a foothold in the state. Sometimes known as the Mark Cathey of Grandfather Mountain, Wiese perfected a technique that deserves far more attention than it gets today—fishing two dry flies in tandem.

Another notable angler was Marion's Cato Holler, who was a founding national director for Trout Unlimited, as well as the originator of a fly with the irresistible name of Infallible. Holler experimented with all sorts of unusual and offbeat materials for tying flies, including the fur of a polar bear he killed on a hunt in the Arctic. He was an early advocate of careful stream management, and put those practices to work on a section of Armstrong Creek that he owned and operated as a private club. Holler's good fishing friends included Walker Blanton, one of the founders (with Holler) of the Lake Tahoma Club and a member of the Armstrong Creek Fishing Club; Alex Shenck, a member of the Cane River Club who owned several trout streams in the northwestern part of the state; and nationally prominent authors Lee Wulff, Dan Bailey and Ernie Schwiebert.

Holler and Wiese had national connections, but there was another, less prominent face of mountain fly-fishing. This featured individuals who fished the public waters of the Nantahala and Pisgah national forests and the streams of the Great Smoky Mountains National Park: It was the sport as I knew it during my boyhood. Thanks to the fact that my father was an avid Appalachian trout man, a representative sampling of these individuals became my fly-fishing heroes. Most are now dead and largely forgotten except as local legends, but they typify those who popularized Tar Heel fly-fishing and gave it a distinctive character.

Among them was Claude Gossett, my father's favorite fishing buddy. He had an uncanny ability to cast with such finesse that the fly fell to the water as delicately as a

JIM CASADA

JIM CASADA

floating feather, and he often experimented with approaches that would make him a more effective fisherman. I remember fishing with him one day, after I had reached a reasonable degree of proficiency, when he made a comment that was a sort of angling epiphany for a youngster. "You've gotten to the point where you can catch trout pretty well," he said, "but if you want to be really good, you've got to change a bunch of things." Among the changes he suggested were using much longer leaders (he regularly cast 16-foot leaders he fashioned by linking eight or 10 sections of different-sized monofilament with blood knots), lengthening my casts and utilizing greater thoroughness in stream coverage. He added one more succinct piece of advice: "For goodness sake, slow down. Trout fishing ain't a wading race."

A year or so later, amid dawn mists on the Nantahala River, he was with me in a moment that offered a perfect example of why you

A Baker's Dozen of Traditional Mountain Fly Patterns

Like caddis in the spring air, trout patterns are without number. Moreover, anyone can wrap some material around a hook and give it a name—perhaps something catchy such as Miss Seduction or Jim's Irresistible Fancy. Catchy names do not necessarily translate to catching fish, but in the case of the 13 patterns that follow—all of them tried-and-true flies developed in the mountains by locals—they work, often wonderfully well. Carry these in your fly box, and you will be well equipped for western North Carolina fly-fishing.

Yallarhammer: Originally tied with the feathers from a Northern flicker (now a protected species, so substitute materials must be used). This is a very effective fly that has been tied in dry-fly and wet-fly versions, as well as on long-shanked hooks for use with spinners. It is the most famous of all traditional mountain patterns.

Royal Wulff: Although named for angling legend Lee Wulff, this fly, under the name Hair-Wing Coachman, was being used in the high country before Wulff popularized it.

Thunderhead: As the name suggests, this high-floating dry fly looks like storm clouds gathering on a summer's day.

Tellico Nymph: Likely named for Tellico Creek (there's one in Macon County and another one in Tennessee), this yellow-and-black pattern imitates caddis larvae.

Adams Variant: One of the relatively few flies that can be identified with a specific individual, this pattern was developed by Bryson City's Fred Hall. It is a sort of cross between a male and a female Adams, with plenty of hackle and yellow in the body.

Marmack Hopper: A grasshopper pattern developed by two Graham County anglers name Marty and Mack, it imitates the greenish gray grasshopper so common in the mountains.

Gray Hackle Yellow: This was Mark Cathey's favorite pattern. Like so many other effective flies, it included the color yellow.

Sheep Fly: Cap Wiese's favorite pattern and one he developed.

George Nymph: Named for Eddie George, this is a variation on another mountain favorite, the Cottontop Nymph.

Hot Creek Special: Developed by Hendersonville's Don Howell, this is a pattern for use in the hot, humid dog days of late summer, as the name implies.

Jim Charley: An old mountain favorite, probably named for a specific individual whom nobody seems to be able to identify, this is a useful attractor pattern.

Orange Palmer: One of Benny Joe Craig's favorites, and he thinks it likely originated in his native Haywood County.

Smoky Mountain Forked Tail: A stone fly nymph imitation that mountain fly-tiers frequently fashioned from crow feathers, although most pattern books suggest wood duck feathers.

Yallarhammer

Thunderhead

Tellico Nymph

Adams Variant

Gray Hackle Yellow

Smoky Mountain Forked Tail

TROUT FLIES TIED BY ROGER LOWE
TROUT FLY IMAGES: NCWRC

JIM CASADA

JIM CASADA

For many years, Frank Young collected stones from streams where he had landed trophy trout. Eventually, he lined the walls of his home with the stones.

should sample and savor every moment astream. "Would you look at that," he whispered, and then pointed to the opposite side of the stream. Instead of the rising trout I expected to see, there was a mother mink swimming with one of her kits in her mouth. We watched as she ferried three tiny bundles across the stream. "Trout fishing always offers magic," Gossett said, "and a lot of times it doesn't have anything to do with what you put in your creel."

Another of Dad's close friends was "Hop" Wiggins, whose lanky frame made wading turbulent waters simple and eating up the miles to remote headwaters a cinch. He was a participant in my first overnight backpacking trip for trout, when he debated carrying a friend and me on his shoulders through a crossing in Deep Creek known as Deep Ford. The stream was swollen from a summer downpour, making it too deep and swift for a couple of boys to wade. Ultimately we took a different route. When I caught my first trout on a fly the following day, he lavishly praised me and made a point of serving up that trout on my plate that evening.

Then there was an inseparable fishing pair from Waynesville, Alvin "Little Man" Miller and Levi Haynes. More than once I heard my father say, "If you want a fine limit of trout, you couldn't make a better choice to catch it than one of these fellows." Miller, who could roll cast with a precision that rendered overhanging limbs insignificant, was a joy to observe. I learned a great deal about proper presentation of a fly in tight quarters from watching him. Sadly, he died relatively young, but his erstwhile partner continued fishing with intensity and passion.

After having saved for years to take a fishing trip to sample Montana's fabled streams, Haynes came back and told his wife: "Sell everything; we're going to move to Montana for us to run a motel and for me to fish." He did precisely that, residing in the little town of Gardiner on the edge of Yellowstone National Park for years. But Haynes eventually returned home. "These old mountains called me back," he said. In later years Haynes had a dog that accompanied him whenever he fished. Haynes' canine companion even had a little backpack of its own for carrying its food when the pair made overnight forays to remote waters. I've heard experienced anglers say that Haynes was the finest fly fisherman they had ever seen.

Most of these men were simple individuals who had known the economic rigors of the Depression and who never even approached affluence, but they brought a great deal of thought, a sense of economy and no small amount of innovation to their fly-fishing.

Most of these men were simple individuals who had known the economic rigors of the Depression and who never even approached affluence, but they brought a great deal of thought, a sense of economy and no small amount of innovation to their fly-fishing. Many tied their own flies, and at least one, Bryson City's Fred Hall, earned a livelihood from doing so. In partnership with his wife, Allene, Hall made a decent living for many years with a mom-and-pop operation that monthly produced thousands of flies. These included several patterns closely identified with the couple, notably the Thunderhead and Adams Variant. The latter was their original creation. Their primary customers were local anglers and sporting goods stores, but their flies were of such high quality that eventually word-of-mouth advertising led to extensive mail sales. Interestingly, Fred was only an indifferent fisherman, and to my knowledge Allene never fished at all.

As these individuals grew old, a new generation of fly fishermen emerged in the 1960s and 1970s. They carried the commonsense approach to fishing and willingness to experiment to an even higher level. Two Hendersonville brothers, Dwight and Don Ray Howell, became accomplished fly-tiers who produced a number of new patterns, along with creating meaningful variants of existing ones. They also exhibited an uncanny knack for consistently catching really big trout.

In nearby Waynesville, Benny Joe Craig quietly worked his way toward becoming a true virtuoso of the vise. His "make-do-with-what-you-have" approach to fly-tying and his willingness to utilize ersatz materials epitomize mountain ingenuity. Examples from his fly-tying include using the bright red band from Lucky Strike cigarettes in fashioning Royal Coachman flies, "rescuing" women's rabbit fur coats from racks in Salvation Army stores for material and encouraging friends who hunted to save the fur and feathers from anything they killed.

Indeed, in Craig's tying room you can find scores of examples of materials, many of them items originally intended for the dumpster, from which he crafts highly effective flies. "It's amazing," he once said, "how many kinds of material can be used to tie flies. I grew up 'making do' with whatever you had, and I've brought the same philosophy to my fly-tying."

Another individual from this period is Bryson City's Frank Young. He returned home from service in the Korean War with a determination to sample and savor as many of the streams of his native highlands as possible. For decades he did just that, spending at least an hour or two fishing an average of 250 days a year. Young also became an accomplished fly-tier. One of his most notable achievements was substituting fur from possum bellies for calf's tail in tying hair-wing patterns such as the Royal Wulff. As Young laughingly says, "It doesn't cost anything to get possum fur, and anyone who can't find it just doesn't understand roadkills."

A religious, contemplative man, Young appreciates the world of the trout with reverence. Over the years, whenever he caught a trophy trout or experienced a particularly memorable day fishing, he picked up a stone from the stream and put it in his creel. Upon returning home, he placed these stones in a frame. When it was full, the addition of some concrete made it one more building block for walls that would eventually line his home. "It's mighty comforting," he reflects, "to be surrounded by all these memories."

One such collection of memories that he shared, as we looked at the stone-studded walls around us, focused on a summer of fishing for big brown trout. "The plant where I worked had a big fish contest," Young said, "and I kept records of every brown trout over 18 inches I caught that summer." His impressive tally numbered nearly 50 fish, and as he pointed at rocks associated with the catches, he offered some invaluable insight for those interested in taking lunker browns. "I caught every one of them before 7:30 a.m. or after 7 p.m.," he said, clearly conveying the message that wary browns prefer conditions of low light.

Fortunately the mountain fly-fishing legacy has found contemporary adherents. One of the best examples of this linkage to the past is Robbinsville's Marty Maxwell. One of the finest trout fishermen I have known, Maxwell wrote his master's thesis in history on noted mountain author Horace Kephart and learned to fish from his grandfather. His connections to the past run deep.

With an adoring grandfather as his mentor, Maxwell's childhood resembles something from Robert Ruark's stories in "The Old Man and the Boy." "He and a friend were the first two dry-fly fishermen in Graham County," Maxwell said. "When I was with him, he never let me fish with anything but a dry fly."

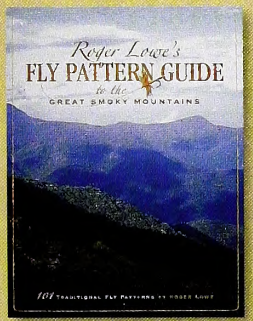
As someone who has spent many hours fishing with Maxwell, I would add that he has obviously absorbed some of Kephart's wisdom. One of my favorite quotations from Kephart is "In the school of the outdoors there is no graduation day." In his approach to fishing, Maxwell lives those words.

Much the same could be said of Bill Rolen, whose father was an early ranger in the Great Smoky Mountains National Park, as well as an expert on Cathey. Rolen, now in his 60s, has become a highly accomplished fly-tier who uses local materials and unusual approaches.

Two others, Kevin Howell and Roger Lowe, have found a way to earn their livelihoods from guiding, tying flies and running fly shops. Howell runs Davidson River Outfitters in Pisgah Forest, while Lowe operates Lowe Fly Shop in Waynesville. Howell is the son of Don Howell, and Benny Joe Craig served as a sort of unofficial mentor for Lowe during his adolescence. This linkage across generations is meaningful, a poignant reminder of the legacy of pioneering mountain fly fishermen.

Although the paraphernalia of the sport has changed greatly, with today's equipment being far superior to that of yesteryear, many aspects of mountain fly-fishing remain the same. The lure of clean waters, wild fish and solitude is timeless. So are the characteristics of hardy highland folks—thrift, independence, practicality and ingenuity. The fishermen of the mountains have applied those qualities to their fly-fishing and created something special amid the deep hollows and steep coves of the Appalachians.

Jim Casada is a freelance writer from South Carolina and a frequent contributor to Wildlife in North Carolina.



Lowe Produces Pattern Guide for Smokies

Who better to write a book of fly-tying recipes for the Appalachians than Roger Lowe, one of the mountain's best-known tiers and guides? Lowe, who grew up in the Smoky Mountains, learned to fish from his father and grandfather. "They taught me to fish small streams and about insects," Lowe said.

"I got my first fly-tying lessons from Ralph Mills and Frank Coffey, who were taught in large part by Benny Joe Craig. We all worked together in Waynesville and shared information about fly-tying in general. Eventually we tied flies for different sporting goods stores and shops all over the United States."

After guiding and tying flies in Cherokee for several years, Lowe opened his own shop and guide service in Waynesville. Lowe guides anglers in the Great Smoky Mountains National Park and on the Nantahala, Davidson, Tuckaseegee, Little Tennessee and French Broad rivers, among others.

A few years ago, Lowe published a hatch book, "Smoky Mountain Fly Patterns," that listed the primary fly hatches for each month and effective imitations. His latest book, "Fly Pattern Guide to the Great Smoky Mountains," grew from that earlier effort. "Customers wanted to know how to tie the flies," Lowe said.

The result is 101 fly patterns that have proven their worth to mountain fly fishermen. Lowe, who has been tying for 38 years, not only provides patterns, but also gives a bit of information about where and when each fly is effective.

Ordering information for Lowe's "Fly Pattern Guide" is available from www.loweflyshop.com or by calling (828) 452-0039.

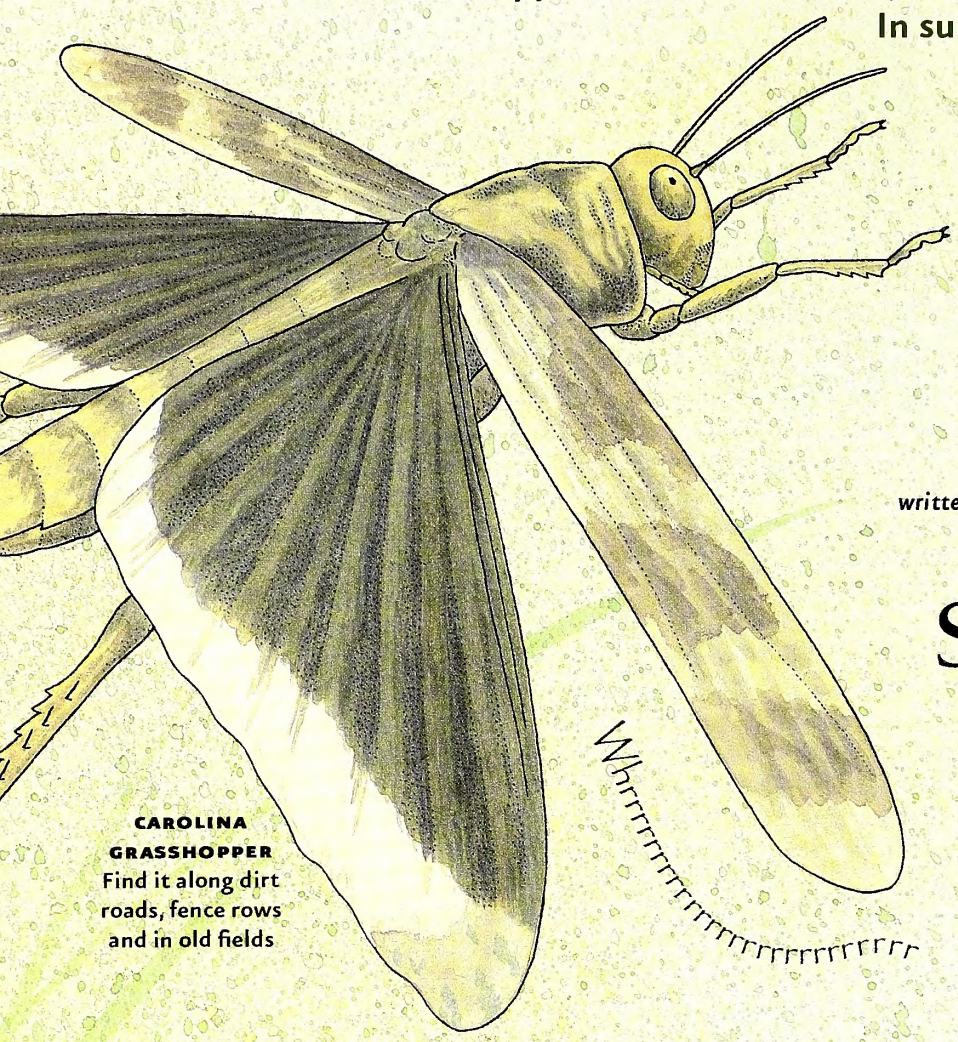
– Jim Wilson

Grasshoppers, crickets and katydids live in every corner of our state. In summer, almost anywhere you look or listen you'll find them . . .

Jumpin' & Jivin'

written by Terry Krautwurst / illustrated by Consie Powell
nature activity by Anne M. Runyon

Stroll through a grassy meadow on a summer day and — *sproing! whrrrr!*— grasshoppers jump like popcorn and fly on buzzing wings. Stand still, and some start calling: *zeeee-zeeee-zeeee-zeeee-zeeee.* As evening falls, crickets and katydids become active, and more insect sounds rise from trees and fields: *chrrrrrr-ip, chrrrrr-ip . . . treet-treet-treet . . . ka-ty-did, ka-ty-did.*



CAROLINA GRASSHOPPER
Find it along dirt roads, fence rows and in old fields

Grasshoppers and crickets can leap up to 20 times their body length.

MEET THE ORTHOPTERANS

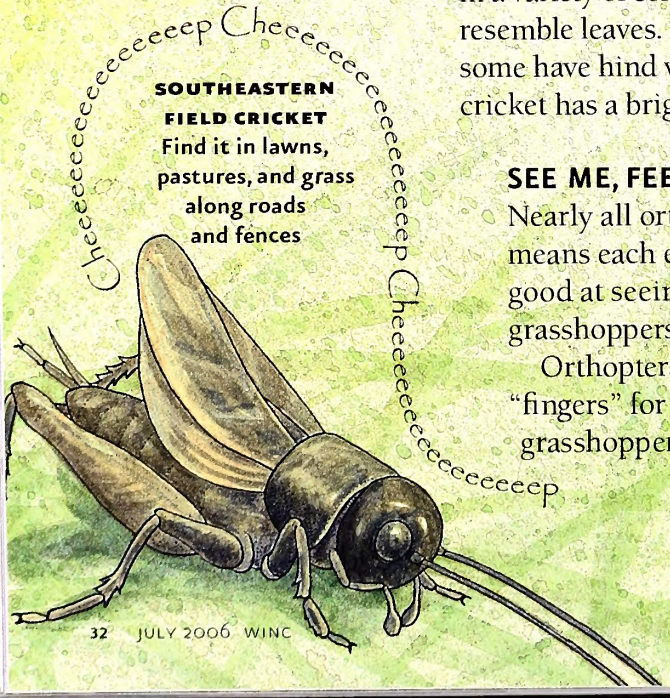
Crickets, grasshoppers and katydids are members of the insect group Orthoptera. There are about 90 different species of grasshoppers and katydids in North Carolina and about 30 species of crickets. They occur in a variety of colors, shapes and sizes. Many katydids are vivid green and resemble leaves. Some grasshoppers have red, yellow or blue markings; some have hind wings as beautiful as any butterfly's. The handsome trig cricket has a bright red head and gold-colored legs.

SEE ME, FEEL ME

Nearly all orthopterans have two large compound eyes, which means each eye has thousands of little lenses. Compound eyes are good at seeing movement in almost all directions, so they help grasshoppers, crickets and katydids stay a jump ahead of predators.

Orthopterans also have two antennae that serve as a nose and "fingers" for finding food and identifying mates. Watch a grasshopper, cricket or katydid: Its antennae are almost always moving, tapping the ground and objects ahead.

SOUTHEASTERN FIELD CRICKET
Find it in lawns, pastures, and grass along roads and fences


Cheeee

Ka-ty-did ka-ty-did ka-ty-did-n't

LEGGY LEAPERS

All orthopterans share one easy-to-see trait: long, thick-muscled hind legs much bigger and more powerful than their other two pairs of legs. Most of the time, grasshoppers, crickets and katydids walk to move around. Hopping uses lots of energy, so they jump only to escape from something.

Some orthopterans have no wings, but most have two pairs of wings. The front wings, called tegmina, are usually thick and leathery. The back wings are wider and fold like a fan beneath the front wings when not in use. They're the wings that provide lift for flying and avoiding enemies.

COMMON TRUE KATYDID
Find it high in leafy treetops

In just one season, a common true katydid calls between 30 million and 50 million times.

WHAT'S THAT SOUND?

Crickets and katydids make music to attract mates by raising their front wings and rubbing the bases together in a scissorslike motion. One wing's base has a rough vein called a file that has a series of shallow ridges. The other wing has a hard, sharp bump called a scraper. When the file rubs across the scraper, sound is produced. This is called stridulation. Grasshoppers make their buzzing and clicking sounds by stridulation too, but their file is usually on a back leg, which they rub against a scraper on a front wing. In most species, only males sing, to call females or claim territory.

Each kind of cricket, katydid and grasshopper makes its own special sound. Most field crickets make clear, musical chirps one at a time and sing at night. Many ground crickets make long buzzes or trilling notes both night and day. In the evening, tree crickets sing continuous chiming notes. Katydids are mostly night singers, too.

With all that sound-making going on, hearing is important for orthopterans. Their hearing organs, called tympana, are small holes or slits, across which is stretched a membrane that vibrates when struck by sound waves. In grasshoppers, these "ears" are on each side of the stomach. Cricket and katydid tympana are located on their front legs. When a female orthopteran hears a male of her own species calling, she gradually moves closer until they find one another and mate.

Grasshoppers and their cousins also have three tiny light-sensitive "eyes" called ocelli — one between the compound eyes, and one on each side of the head — that scientists think help the insects sense the changing of seasons as days grow shorter or longer.

Zeeee-zeeee-zeeee-zeeee-zeeee

SPOTTED-WING GRASSHOPPER
Find it in sunny areas, from pastures to forest edges

Many grasshoppers are strong fliers. Most katydids are clumsy fliers or use their wings only to flutter to the ground. Nearly all crickets are flightless.

Click-click-click-bzzzzzzzzzzzzzzz

chee-chee-chee-chee!

HANDSOME TRIG (SWORD-TAIL CRICKET)
Find it in low bushes along streams and in marshes

COMMON MEADOW KATYDID
Find it in pastures and along grassy fencerows and roadsides

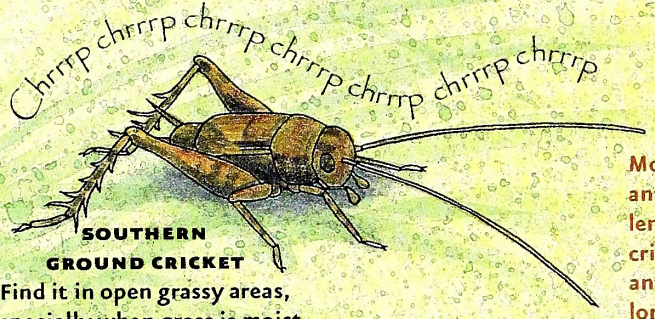
SNOWY TREE CRICKET
Find it in leafy shrubs and low in trees

The grasshoppers, katydids and crickets illustrated on these pages are shown at twice their actual size.

GROWING, GROWN

About a week after mating in summer or fall, females lay eggs. Depending on her species, a grasshopper mother lays from four to 100 eggs in a small tunnel dug in the soil with her abdomen. Female crickets and katydids deposit their eggs through a tubelike structure called an ovipositor. Some place their eggs in soil, and others on or inside plant stems or leaves.

The eggs stay hidden through the winter. When they hatch in spring, the babies, called nymphs, look like tiny adults, but without wings or antennae. Nymphs can't fly or make sounds, but they can walk, hop and eat. Nymphs grow rapidly. Like all insects, they have a hard skin, or exoskeleton, that doesn't stretch. So nymphs must molt, or shed their skin, to make room for their growing bodies. Some kinds molt as often as once a week. After four to six molts, the insects become adults. This series of changes, from egg to nymph to adult, is called incomplete metamorphosis.



SOUTHERN GROUND CRICKET
Find it in open grassy areas, especially when grass is moist

Most grasshoppers have short antennae less than half the length of their body. Most crickets and katydids have antennae that are as long or longer than their body.

NOT SO PESTY

Katydids and crickets eat mostly plants, but they also eat fungi, lichens and other insects — including other katydids and crickets. Grasshoppers eat almost nothing but plants.

Orthopterans are an important food source for all kinds of creatures. Spiders, snakes, birds, skunks, raccoons, foxes and mice are just a few of the animals that make meals of grasshoppers, crickets and katydids. In some parts of the world, people eat them too.

Get Outside

Tell the temperature with a "thermometer cricket." Snowy tree crickets, which live in much of North Carolina, are called "thermometer crickets" because their singing can tell you the temperature. Explore the Nature Activity on the next page to find out how.

Catch and identify grasshoppers, crickets, and katydids. Ground and field crickets are the easiest to catch. Listen for them and follow the sound. They usually hide among dead leaves and under rocks and logs. Grasshoppers and katydids are harder to catch. Some kinds bite if you handle them roughly, so it's best to use an insect net. Once you've caught a cricket, grasshopper or katydid, put it in a jar in which you've placed some dry dirt or sand and some fresh grass or leaves. Don't put more than one insect at a time in the jar, because they might fight. Use a field guide to help you identify your catch, then let it go in the same place you found it. Try not to keep it in the jar for more than an hour.

Read and Find Out

- "Field Guide to Grasshoppers, Katydids, and Crickets of the United States" by John L. Capinera, Ralph D. Scott, and Thomas J. Walker, Cornell University Press, 2005.
- "Grasshoppers and Crickets of North America" by Sara Swan Miller, Franklin Watts, 2003.
- "Crickets and Grasshoppers" by Elaine Pasco, Blackbirch Press, 1999.

In *Wildlife in North Carolina:*

- "Songs for Survival" by Lawrence S. Earley, September 1985.

On the World Wide Web:

- "Singing Insects of North America," http://buzz.ifas.ufl.edu/
- "Orthoptera,"www.cals.ncsu.edu/course/ent425/compendium/orthop.html

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make An Arboreal Quartet of Snowy Tree Crickets

1) Cut out box.
2) Fold in half twice with cricket design on top.
3) Carefully cut away the orange areas.
4) Now gently unfold four pale-green male crickets.

Snowy tree crickets live in much of North Carolina. To find one, listen for a high-pitched *treet-treet* in bushes and in low trees. You should hear individual chirp notes, one after the other, in a steady rhythm. Now, while looking at your watch, count the number of chirps the cricket makes in 13 seconds. Add 41. Usually, the total is within a few degrees of the actual air temperature.

How does this work? Crickets, like other insects, are cold-blooded and are more active in warm weather. The warmer the temperature, the faster they rub their wings together to make sound.

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Commission Makes Major Land Acquisitions

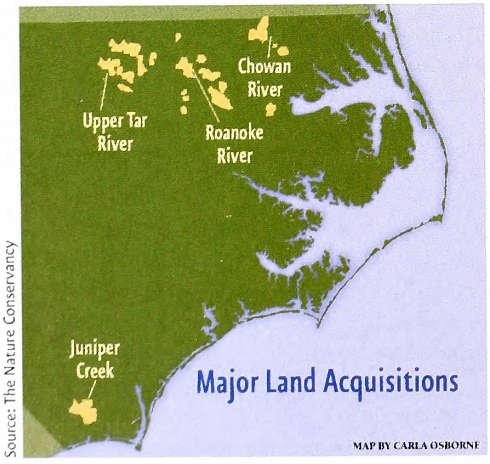
The N.C. Wildlife Resources Commission will acquire more than 65,000 acres of land from International Paper Corp. as part of a multistate, multiagency deal.

MARK DANIELS/THE NATURE CONSERVANCY

"What we're protecting is priceless," said Gov. Michael Easley, who announced the land deal in March at the Wildlife Commission headquarters in Raleigh. The governor was joined by officials from other state agencies, International Paper and The Nature Conservancy, which brokered the transaction. "This was an opportunity we just could not pass up," Easley said.

The North Carolina tracts, scattered across the northeastern and southeastern portions of the state, are part of a massive sale of International Paper land holdings in 10 Southeastern states. The company is selling more than 218,000 acres—from Virginia to Arkansas and as far south as Florida—to The Nature Conservancy and other conservation groups, which will in turn sell much of the acreage to state conservation agencies such as the Wildlife Commission.

The North Carolina properties consist mostly of bottomland forests, floodplains and wetlands, making them valuable for water quality protection. Several tracts also contain rare and endangered plants and animals. Much of the North Carolina land, totaling 77,090 acres, is near or adjacent to Wildlife Commission game lands. About 66,000 acres that the commission is set to acquire will enlarge existing game lands. The commission currently owns or manages 2 million acres for public hunting, fishing, trapping and other outdoor recreation.



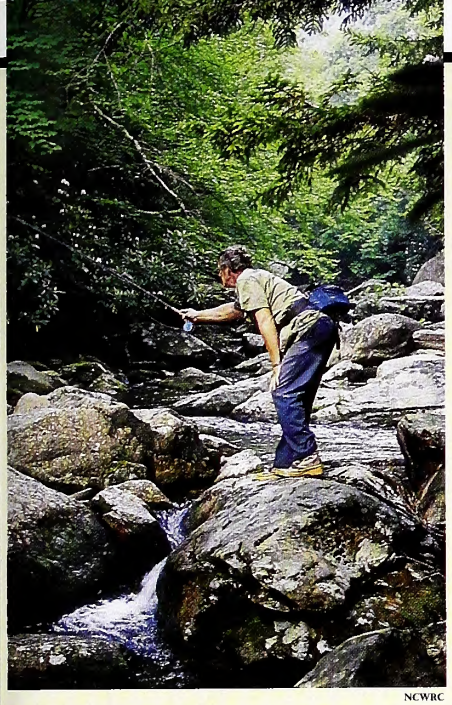
Source: The Nature Conservancy

John Pechmann, chairman of the commission, said the agency will "make the property accessible to all North Carolinians, regardless of whether you fish, hunt, watch birds or hike. We will maintain the integrity of the land in its natural form." The remaining tracts, about 11,000 acres in all, will go to the state Division of Parks and Recreation, the Department of Cultural Resources and private conservation buyers such as hunting clubs that agree not to develop the property.

The land consists of five broad areas:

- 15,464 acres along the Chowan River in Gates and Hertford counties near the Virginia line and adjacent to Chowan Swamp Game Land.
- 22,009 acres along the lower Roanoke River in Halifax, Northampton, Bertie and Martin counties near state game lands and federal wildlife refuges. These bottomland hardwoods forests provide habitat for more than 250 bird species.
- 18,341 acres along Juniper Creek in Columbus and Brunswick counties. This tract is valuable not only for its natural features, but also because it will connect other conservation lands—Lake Waccamaw State Park, The Nature Conservancy's Green Swamp Preserve and the commission's Columbus County Game Land.
- 20,749 acres along the upper Tar River in Franklin, Warren, Nash, Edgecombe and Halifax counties, near Shocco Creek Game Land and Medoc Mountain State Park.
- 527 acres in Hoke County near Raeford, which the commission will not acquire. The land is slated to become a community forest.

Total cost of the North Carolina land is between $80 million and $82 million, said Katherine Skinner, executive director of the state chapter of The Nature Conservancy. More than $70 million will come from public funding sources—including the state's three land-acquisition trusts, the Clean Water Management Trust Fund, the Natural Heritage Trust Fund and the Parks and Recreation Trust Fund. The remainder, about $10 million, will come from conservation buyers, easements and private fund-raising.



NCWRC

Park Service Opens Brook Trout Fishing

For the first time in more than 30 years anglers at Great Smoky Mountains National Park will be allowed to catch and keep brook trout under new experimental park fishing regulations that took effect April 15. Since 1976 the National Park Service has allowed anglers to keep native rainbow and brown trout, but they have been prohibited from possessing the park's native brook trout or from fishing in more than 150 miles of park streams where "brookies" predominate. Rainbows and browns were stocked in the park in the early 20th century after destructive logging practices nearly wiped out the native brook trout.

Biologists in the early '70s were convinced that brook trout were systematically losing range to the non-native fish and predicted that, unless measures were taken, the brook trout would only be found upstream of natural barriers by the year 2000. Park managers also believed that fishing pressure was further reducing brook trout densities. In response to these concerns, managers closed the park to brook trout fishing in 1976 and initiated brook trout restoration projects in select streams.

Thirty years later park fisheries biologists have found that brookies are able to coexist with the non-native trout in 69 miles of park streams. Park fisheries managers have successfully restored 17 miles of stream to a pure brook trout population using a combination of electrofishing and chemicals to remove non-native trout from stream segments that lie above waterfalls and other barriers that prevent upstream movement of fish.

After more than 25 years of monitoring trout and nongame populations in fished vs. closed streams, park biologists determined that natural occurrences such as floods and droughts were the major force behind changes in fish populations in both open and closed streams. They suspected that allowing angling for brook trout would have no measurable impact on the species' numbers or average size.

In 2002 park biologists tested that hypothesis by experimentally opening eight streams (four in Tennessee and four in North Carolina) to fishing and harvest for three years under the normal park fishing regulations (five fish per day limit, 7-inch minimum size and single-hook artificial lures only). Each stream that was open had a nearby control stream which remained closed. Biologists analyzed population data within each stream (both open and closed) for three years prior to and three years after brook trout fishing was opened.

The study found there were no significant differences in brook trout density or the number of legal brook trout in any stream opened to brook trout fishing during the study period.

In interviews conducted during the experiment, more than 84 percent of anglers said they were moderately to extremely pleased with the opportunity to fish for brook trout. The largest segment of the anglers (25–27 percent) cited the opportunity to catch a brook trout as the main reason for fishing that particular stream that day. "Given that we could find no ecological benefit to prohibiting anglers from taking brook trout," said park supervisory fisheries biologist Steve Moore, "and the opportunity to offer anglers a very enjoyable experience, park management has decided to open nearly all our streams to fishing.

"All but a handful of the over 700 miles of park streams will be opened to fishing as part of an experimental regulation to allow additional time to monitor impacts of fishing activity. A few short stream segments will still be closed during active brook trout restoration projects. Parts of Sams Creek, Bear Creek and Indian Flats Prong streams will remain closed while those populations continue to rebuild to carrying capacity. Once these streams reach carrying capacity, they will be reopened to fishing as well."

IN SEASON

This month, this season is open in North Carolina:

Crow: Wednesday, Friday and Saturday of each week, plus Labor Day, Thanksgiving and Christmas each week through Feb. 28.

Check the *2006–2007 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Scaup Subject of Latest N.C. Duck Print

North Carolina's 2006 Waterfowl Stamp and Print, "Scaup at Gull Rock Game Land," will go on sale on July 1. The print, by Gerald Putt of Boiling Springs, Pa., portrays scaup approaching a rig of decoys on Pamlico Sound. The Hyde County game land is a popular wintering spot for bluebills, as scaup are commonly called.

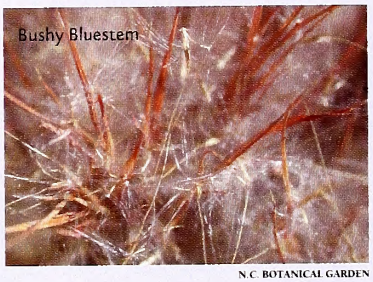
The print was unveiled at the 11th Annual East Carolina Wildlife Arts Festival and Decoy Carving Championships in Washington last February. The acrylic portrait, which won "Best of Show" at the festival, is the last in a series of five paintings that portrays waterfowl hunting traditions on Wildlife Commission-owned game lands and impoundments.

Signed and numbered regular edition prints with mint stamps of the portrait will be available on July 1 for $145. The stamp is $10. Visit the Wild Store at www.ncwildlife.org or call 1-866-945-3746 for more information.

UNC's Botanical Garden Joins Preservation Project

UNC-Chapel Hill's conservation efforts are sprouting up across the country and around the globe. UNC's Botanical Garden, a research and conservation garden, recently announced a partnership with the United Kingdom's Royal Botanic Gardens, Kew, to preserve plants of the United States' Piedmont ecoregion, which spans the states from Delaware to Alabama.

Dubbed the Atlantic Flora Project, the partnership is part of an international plant conservation initiative led by Kew Gardens and known as the Millennium Seed Bank Project (MSBP). With partner institutions on nearly every continent, the MSBP is striving to collect and conserve 10 percent of the world's seed-bearing plants. As a partner in the program, the Botanical Garden will lead the southeastern portion of the North America program, titled the Atlantic Flora Project.


Bushy Bluestem

N.C. BOTANICAL GARDEN

In North Carolina, the green industry (nursery, greenhouse, Christmas tree and turf grass industries) accounts for $1.2 billion in farm income, according to the N.C. Department of Agriculture. Peter White, director of the Botanical Garden and a biology professor at UNC, said many of the species to come out of the Atlanta Flora Project are expected to find a place in the horticultural trade and habitat restoration industries. "A mounting need for native plants for use in both landscape restoration and the green industry makes this project extremely timely."

The garden will collect seeds from about 250 species of native plants and study the propagation requirements of these species with help from the Mt. Cuba Center, various botanical gardens and native plant societies in surrounding states.

The initial focus will be the Piedmont ecoregion, a broad area that runs parallel to coastal regions throughout the Southeast and is marked by geologic and climatic conditions that produce high plant diversity. About 50 ecosystems occur in the region, as do many major metropolitan areas such as Atlanta, Charlotte and Richmond, Va.

The collected and processed seeds from the Piedmont ecoregion will be stored in climate controlled seed banks at Kew Gardens, which are located south of London, and at the Botanical Garden in Chapel Hill. Results of the project will be disseminated to the scientific, restoration and horticultural community.

Wild Indigo

N.C. BOTANICAL GARDEN

CALENDAR OF EVENTS

Sunday, July 2

Take a hike and view birds with Chimney Rock Park ornithologist Simon Thompson from 9 a.m.–noon. Species should include downy, hairy and pileated woodpeckers, among others. Visit chimneyrockpark.com or call (828) 625-9611.

Saturday, July 8

Check out the 43rd Annual Coon Dog Day in Saluda. Festival begins at 7 a.m., with contests and judging for dogs starting at 1 p.m. at Saluda Elementary School. Visit saluda.com or call (828) 749-2581.

Wednesday, July 12

Learn about knots used in boating in the Basic Knots Workshop at the N.C. Maritime Museum on Roanoke Island. Cost is $30 for friends of the museum or $40 for non-members. Visit obxmaritime.org or call (252) 475-1750.

Saturday–Sunday, July 29–30

Check out the 7th annual Wildlife Festival and the 17th annual Peach Festival on Knotts Island. Admission of $5 covers both festivals. Wildlife Festival will feature decoys, photographers and artists among other exhibitors. Contact Knotts Island Ruritan Club at (252) 429-3000 for more information.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

ON PATROL

Wildlife officer William Carlisle and Sgt. Russell Byerly were checking fishing around Lake Norman on a Sunday when Carlisle received a call from a friend who was scouting the Catawba Game Land for doves to hunt the next morning. The friend reported that there was a man sitting in the middle of a field there hunting doves in violation of the law prohibiting Sunday hunting.

The officers drove to the game land and found a truck with hunting gear in it. They unlocked the gate and drove to the field where they found the man hunting. The hunter was very polite and seemed glad to see the officers.

When Officer Carlisle explained the problem to the hunter, the man explained that he had recently moved from another state where you could hunt on Sunday, and that he had not thought twice about doing so. As Officer Carlisle was writing the ticket, the man did say that he had been wondering all day why no one else had showed up to hunt.

ILLUSTRATED BY JACKIE PITTMAN

The Wildlife Endowment Fund

~An Investment for the Future~

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses and lifetime magazine subscriptions is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

The licenses listed below do not authorize fishing in coastal waters.

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Personalized Sportsman Infant $205
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)
- ☐ Personalized Sportsman Youth $355
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of a certified birth certificate (or the mother's copy) must accompany applications for infant and youth sportsman's licenses. Hospital copies will not be accepted. Birth certificates cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult at least 21 years of age, who is properly licensed to hunt in North Carolina. "Accompanied" is defined as being able to take immediate control of the hunting device.

Adult (age 12 or older) *(check appropriate block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes basic inland fishing, trout & traut waters an game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes basic hunting, big game, game lands, primitive weapons & N.C. waterfawl)
- ☐ Sportsman. $500
  (N.C. residents only age 12 ar older—includes basic hunting & inland fishing, big game, game lands, primitive weapans, traut & N.C. waterfowl)
- ☐ Personalized Sportsman $505
  (N.C. residents only—includes same privileges as the Spartsman)
- ☐ Nonresident Sportsman $1,000
  (age 12 or alder—includes basic hunting & inland fishing, big game, game lands, primitive weapons, traut & N.C. waterfawl)

A federal waterfowl stamp must be purchased separately for all N.C. licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

City _____ State _____ Zip _____

County _____ Date of Birth _____ Driver's License # _____

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Note: Only adult lifetime licenses may be purchased by phone (VISA or MasterCard only). Call toll-free (1-888-248-6834). Use this form to purchase infant and youth lifetime licenses by mail.

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NCWRC, License Section, 1707 Mail Service Center, Raleigh, NC 27699-1707

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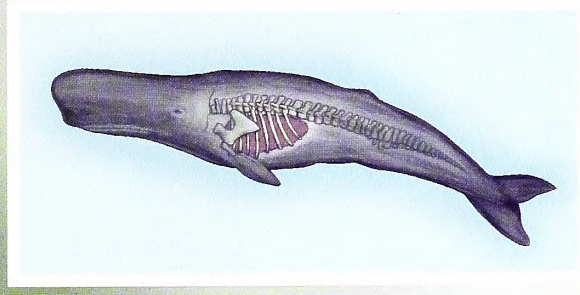
How Can Sperm Whales Dive So Deep?

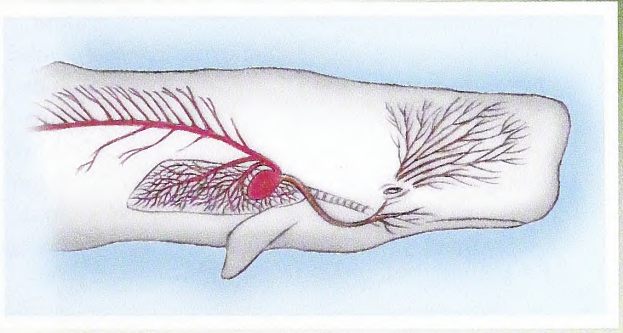
written by Clyde Sorenson
illustrated by Alison Schroeer

SPERM WHALES CAN DIVE more than a mile down, where the weight of water creates crushing pressures exceeding 3,000 pounds per square inch (the atmosphere at sea level exerts about 14 psi). Whales have a number of adaptations allowing them to dive to great depth.



The whale's rib cage isn't crushed because it's designed to collapse—it has much looser connections between ribs, and between ribs and the backbone, than a terrestrial mammal. As the whale descends and its ribs collapse, its lungs are compressed, ultimately to about 1/100th their original volume.

It takes about 25 minutes for the whale to descend close to a mile and about the same time to return to the surface. Much of the tremendous store of oxygen it needs for an hour-plus dive is housed in its muscles. Whale muscle cells are densely packed with myoglobin, an oxygen-holding chemical. A dense network of special capillaries helps feed the gas to the muscles and holds a reservoir of oxygenated blood.



The whale's heart rate drops dramatically when it dives, and much of what blood does circulate is shunted to the brain by a special system of vessels around the heart. Blood flow to most other organs drops for the duration of the dive.

Fried Sardines and Other Disasters

written by Jim Dean

There's a classic "Saturday Night Live" skit that pokes fun at old TV infomercials for kitchen aids that were guaranteed to slice or dice everything (bet there's a Veg-O-Matic in your pantry, too). A glib "SNL" announcer demonstrated the Bass-O-Matic by cramming a whole largemouth into a blender to create a bass milkshake. Yuck!

JIM DEAN

That's not, however, a lot worse than some of the fish I've eaten over the years. Pete Leo once put the bloody carcass of a false albacore into a blender along with various spices in an attempt to make a dip. The false albacore (aka little tunny or spotted bonito) is generally regarded as inedible, and his experiment did nothing to improve that reputation. "Looked like peanut butter, and smelled like a menhaden factory," he remarked.

Then, there was the time a high school buddy ran short on groceries during a camping trip and was inspired to fry several cans of sardines. We buried the resulting mush, and I believe the campground is still a toxic waste Superfund site.

"The false albacore is generally regarded as inedible, and his experiment did nothing to improve that reputation."

Few of us are ambivalent about the taste of fish. We either like it, or we don't. For many years, I was in the latter category. Part of that is undoubtedly because the fish I was introduced to as a child were bony little critters. Once a bite of something is in my mouth, I prefer not to take it out, sort though it and decide what can be safely returned.

Furthermore, those fish often tasted, well, fishy. I would eat a fish stick, and I would sometimes try one of Mom's croquettes made with canned salmon, but invariably I would run into a vertebra, which is like finding a sand spur in your hamburger. Besides, if the canners didn't bother to remove backbones, what were the odds that those fish had even been gutted?

I was probably in my 30s before I developed a taste for fish. Even now my preference is for non-fishy fillets, and I'm still picky about how I like them prepared. Some might find this odd considering that my favorite pastime is fishing, although this makes it easier for me to practice catch-and-release angling.

Several memorable meals changed my mind. One was a red snapper I caught off Pensacola, Fla., in the 1970s. That evening, a cook in the hotel restaurant fried it in tempura batter. It was stunningly delicious. Another was a pompano I had in New Orleans cooked in the classic French Creole fashion with tomatoes and onions in a paper bag.

Nor will I ever forget the fish my daughter, Susan, recommended I try in a small Italian restaurant in Georgetown years ago. Garlic cloves were stuffed into slits along the flanks of a whole flounder that had been brushed with olive oil and quickly broiled. Clearly, my education regarding fish as food needed further exploration.

As is often the case with those of us who finally discover what we have been missing, I have formed some opinions. Everyone will agree that fish are always best when they are absolutely fresh, but I fear we don't always get truly fresh fish in restaurants and supermarkets. I see some pretty sad specimens displayed on ice—their gills gray, eyes sunken, flesh rapidly growing mushy and beginning to reek of iodine. It's harder to detect deterioration in precut fillets, but the nose is a pretty reliable indicator.

Those of us who catch our own fish have the advantage of assuring freshness, but I suspect we could often do a better job of the cooking. Some will certainly disagree, but for fried fish I believe there are better choices for the batter than coarse corn meal, which tends to burn.

Commercial mixes that include finely ground cornmeal are better, but I prefer cracker meal, Panko or even Bisquick. I add a raw egg to whole milk or buttermilk along with salt and pepper, then dip the fish in that before rolling it in the cracker meal. Then I dip it and roll it again before putting it in very hot oil. I think it's better to cook only a few pieces at the time—that keeps the oil temperature high—turning them only once and making sure they aren't overcooked (a couple of minutes a side is usually adequate).

There are many great recipes for fish nowadays, some quite elaborate, but the best remain fairly simple and do not mask the delicate flavor of the main course. Old prejudices die hard, and I still tend to prefer saltwater fish that can be filleted, although walleye and catfish are hard to beat. I've also discovered that, pound for pound, largemouth bass are one of the tastiest fish that swims. The trick is to skin and fillet them before cooking. All that muddy flavor is in the skin.

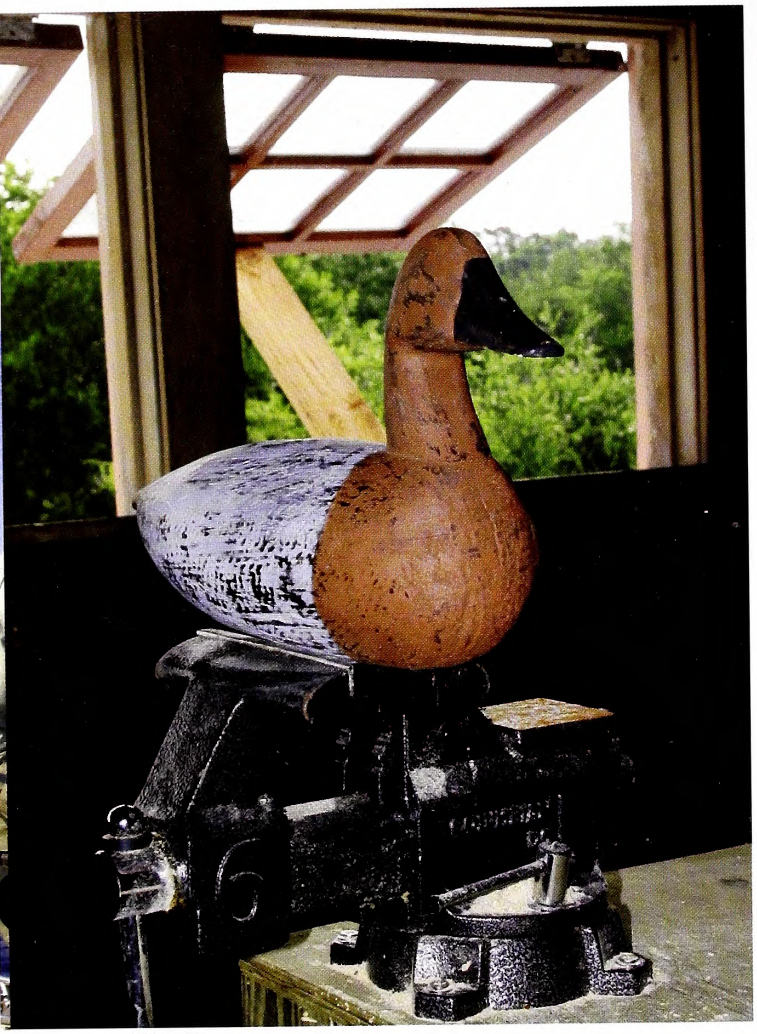
Un-Bony appétit!

JAMES D. WATT/IMAGEQUEST MARINE.COM

Green sea turtle

OUTDOOR MOMENT

IN THE AUGUST ISSUE



A. MACK SAWYER

OBX WILDLIFE
The opening of the Outer Banks Center for Wildlife Education provides a place to learn about the area's sporting heritage.

BRAINLESS WONDERS
North Carolina's marine jellyfish are best known for their sting, but they are actually complex creatures with fascinating adaptations.

GOOD DOG
When a regular Joe adopts a 2-year-old Labrador retriever from the pound, is it possible to train her to be a top-notch duck dog?

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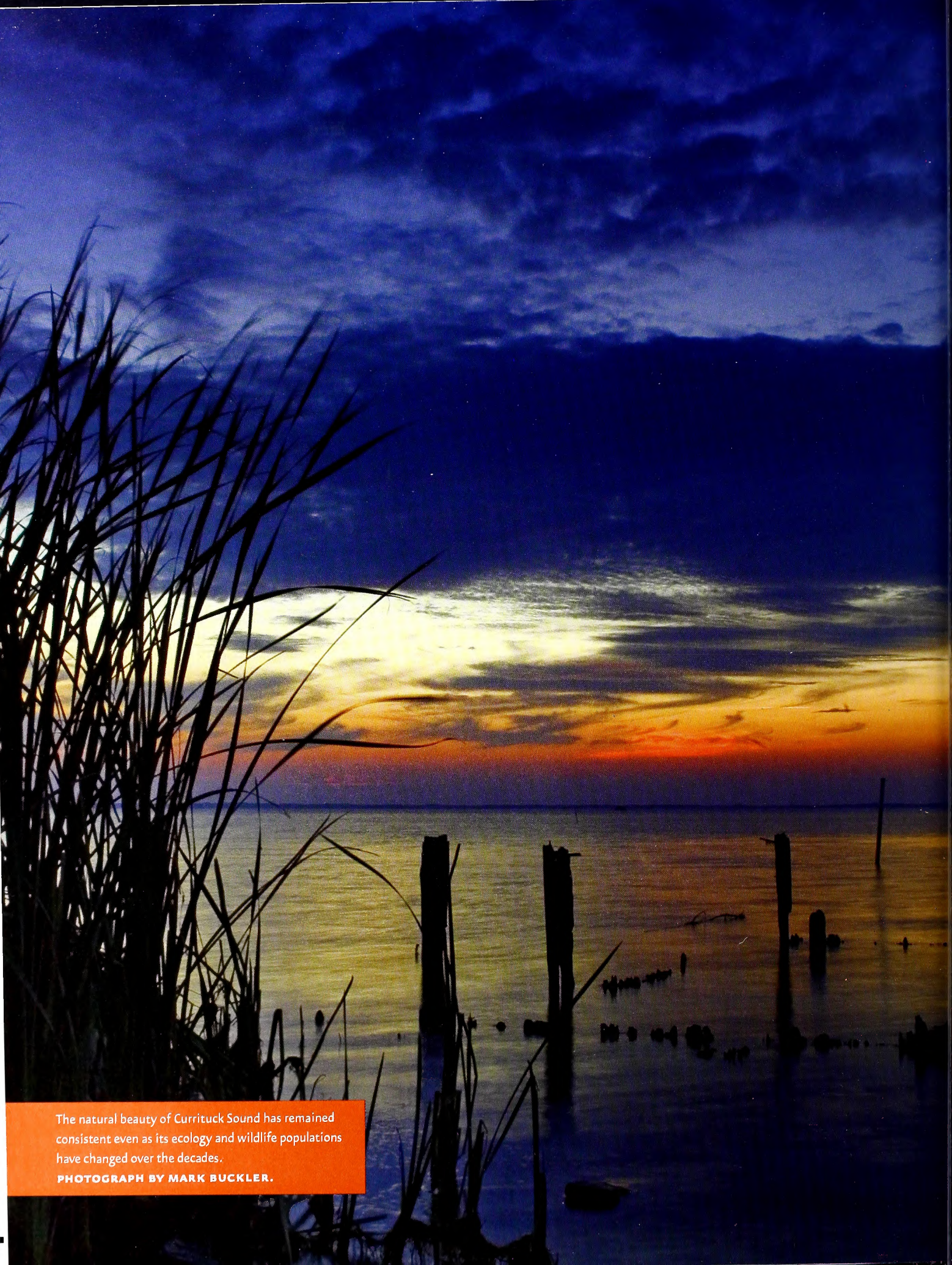

The natural beauty of Currituck Sound has remained consistent even as its ecology and wildlife populations have changed over the decades.
PHOTOGRAPH BY MARK BUCKLER.

Volume 70 | Number 8

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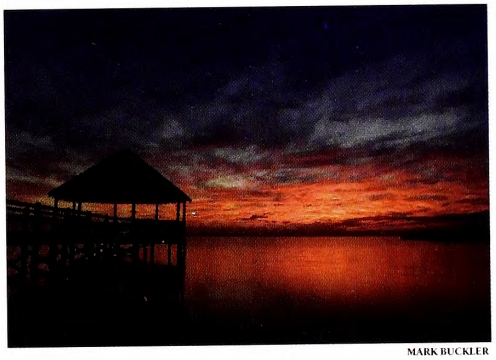
Cover: Translucent, free-floating moon jellyfish are found often in the waters and beaches of North Carolina. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Edna was doing a great job guiding a tour of Corolla's historic Whalehead Club, but as my group entered another of the grand structure's gorgeous rooms, I caught a glimpse through a window of something even more lovely outside. So I slipped away from the tour group, out the club's front door and over to the edge of Currituck Sound, a few dozen yards from the building.



MARK BUCKLER

As I stood watching the blood-red sun sink into the sound, purple and orange patterns swirling on the water's surface, I imagined that I could have viewed a similar brilliant sunset from that same place 150 years ago, perhaps after a long day of duck hunting or crabbing. Thankfully, despite the massive changes taking place in the area, that spot will always be available for sunset watching.

It used to be that change came slowly to the northern Outer Banks. Now, every sunrise reveals more new homes being built on every inch of sandy real estate. Development is a sore subject among those for whom local traditions die hard. Fortunately, Currituck Heritage Park is a quantum leap in preserving the traditions and history of the area. The 39-acre park consists of the Whalehead Club, the Currituck Beach Lighthouse and the brand-new building at the Outer Banks Center for Wildlife Education (see "Sound Traditions," page 4). Wildlife educators have offered classes there for years, but the opening of the building is the final piece of the puzzle, completing Currituck Heritage Park as a top-notch visitors' destination.

In the space of a day or a couple of afternoons, you can tour the Whalehead Club, climb the lighthouse and take a class or two at the education center. Each facility at the park offers a different take on the history and natural resources of the area. Every North Carolinian should learn about this formerly remote section of the state. Development might be here to stay, changing the look of the northern Outer Banks every day, but Currituck Heritage Park will ensure that the area's traditions are documented forever—and the sunsets are always free.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

AUGUST 2006 VOLUME 70, NUMBER 8

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Ticklish Subject

I have some concerns about your June article on ticks ("Ticked Off"). Rocky Mountain spotted fever also comes in a "spotless" version. People can be infected and not show a rash. They are still very much at risk and need to be encouraged to consider a RMSF diagnosis.

Also, a search online for "Lyme disease pictures" shows a wide range of inflammation patterns on people. It is not always a bull's eye or even a circle. The image in the article is not typical. I was infected and had only a round, red bruise the size of a 50-cent piece on my shoulder. Blood tests for Lyme disease are often inaccurate, so people need to take any inflammation around a deer tick bite very seriously.

For hiking in tick-infested woods, a friend uses a unique approach: She tucks her jeans into her socks and puts a dog's tick and flea collar around each ankle. Those with farms can deal with ticks by applying permethrin insecticide to the shoulders, necks and heads of deer through feeders. Mice are treated through feeders or by placing containers with cotton nesting materials that contain insecticide. These practices have resulted in a decrease of more than 90 percent in tick populations. Thanks for the great mag.

Jennie Knoop
Oxford

Clyde Sorenson: The suggestion to use dog collars around the legs is improper use of a pesticide product that can cause inflammation. Permethrin and DEET are far more effective and safe when used as directed. I indicated in the article that anyone experiencing suspicious symptoms after a tick bite needs to consult a doctor as soon as possible, rash or not. I also mentioned that the bull's eye rash associated with Lyme doesn't always occur. When I contracted RMSF, I experienced no rash because we started treatment early enough. There has been a great deal of research on reducing tick populations by treating hosts like mice and deer. While there have been sporadic successes, personal vigilance for ticks is still the most important tool people have to protect themselves from tick-borne disease.

Grand Reopening

Thank you for the timely article on the reopening of the N.C. Aquarium at Pine Knoll Shores ("Fish-Eye Lens," June 2006). After closing for a 2½-year renovation project that tripled the size of the facility, the new aquarium is once again open to the public. The response has already been tremendous, with over 100,000 visitors in the first month alone. The three N.C. Aquariums will host over 1 million visitors this year.

The nonprofit N.C. Aquarium Society was pleased to have played a role in the aquarium's expansion and what director Jay Barnes described as turning "fascination into a learning experience." Congratulations to the staff of the new facility that worked so hard to get the aquarium open on time and within budget!

David Womack, Chairman
N.C. Aquarium Society
Raleigh

Flowing Praise

Thank you for writing about the work of the Clean Water Management Trust Fund in June ("Protecting Water, Preserving Land"). Sen. Marc Basnight and the N.C. General Assembly have created a great tool to help local governments, conservation organizations and state agencies protect and restore water quality. Thanks to appropriations from the General Assembly, CWMTF has helped the Wildlife Resources Commission protect almost 102,000 acres in the last 10 years as public game lands.

Bill Holman, Executive Director
Clean Water Management Trust Fund
Raleigh

Thank you very much for your feature on the Clean Water Management Trust Fund's 10th anniversary. Every citizen of our state owes a debt of gratitude to the fund and its staff, Sen. Basnight for his foresight in creating the fund and to the N.C. General Assembly for providing appropriations these last 10 years.

The Nature Conservancy is fortunate to work closely with the Clean Water Management Trust Fund. With their assistance, we have leveraged funds to protect thousands of acres across North Carolina. Places like Alligator River, the Black and South rivers, Grandfather Mountain, the Little Tennessee River and the Roanoke River have all benefited from the availability of these funds, which keep the state's waters clean and healthy for all of us to enjoy.

The Clean Water Management Trust Fund is more than a model for other states to follow—it is more like a revolutionary idea that other states dream of creating. On behalf of our 23,000 members in North Carolina, The Nature Conservancy thanks the Clean Water Management Trust Fund for everything they do. And thank you for bringing their important work to the attention of your readers.

Katherine Skinner, Executive Director
The Nature Conservancy
Durham

Nobody's Perfict

In "Protecting Water, Preserving Land," Burt Kornegay's guide service was referred to as Slickrock Adventures, but is actually Slickrock Expeditions, accessible on the Internet at slickrockexpeditions.com.

In "Ticked Off," the scientific name of the American dog tick is *Dermacentor variabilis*, and the lone star tick is *Amblyomma americanum*.

write us

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F. EUGENE HESTER

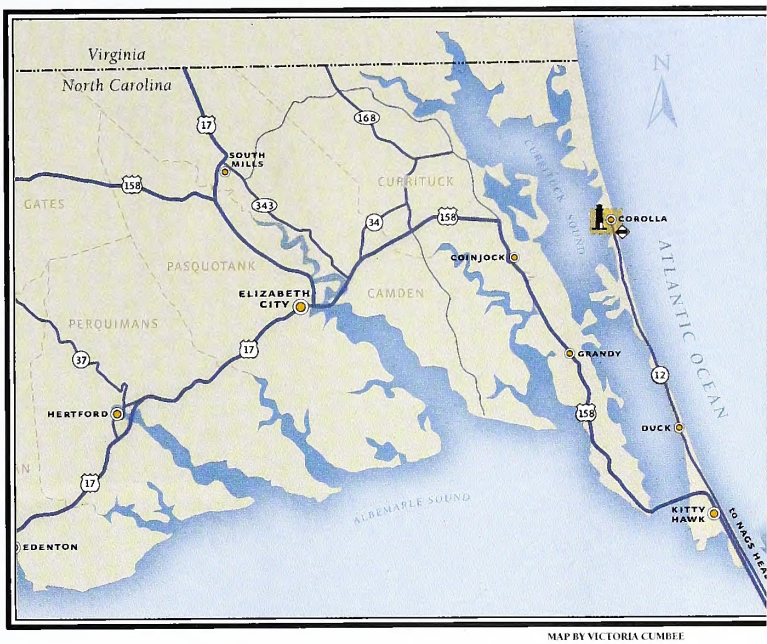
Tiny paw prints of a fox dotted the sand near the new Outer Banks Center for Wildlife Education in Corolla. There were deer tracks, too, and raccoon. A flock of geese honked on a nearby pond, and a couple of tundra swans flew low over the marsh, straining against a stiff wind.

Nestled along the shoreline of the Currituck Sound, at the edge of a marsh and a maritime forest, the 22,000-square-foot education center offers indoor exhibits and outdoor classes on the state's coastal wildlife, habitat, people and culture. The N.C. Wildlife Resources Commission leases three acres from Currituck County on the grounds of the historic Whalehead Club. The 131-year-old Currituck Beach Lighthouse sits just a few hundred yards to the north.

SOUND

THE OUTER BANKS CENTER FOR WILDLIFE EDUCATION HELPS REVEAL THE CULTURAL AND NATURAL HISTORY OF THE UNIQUE CURRITUCK REGION.

written by Jeffrey Hampton
photographed by Mark Buckler



MAP BY VICTORIA CUMBEE

The idea is to make one trip to visit all three places — the Whalehead Club, the education center and the lighthouse. "We want to make the entire heritage here a single experience," said Clarence Styron, director of the education center. Adjacent to the center is a strip of land, owned by the state, that runs about 2,500 feet from ocean to sound where education center experts conduct many of the outdoor classes. "What you end up getting is a cross section of a coastal barrier strip," said Mark Buckler, the center's program coordinator.

The Whalehead Club was a private hunting lodge and retreat built in the 1920s by Edward C. and Mary Louise LaBel Knight of Philadelphia. The Knights, like many wealthy Northerners of the period, were drawn to the area by the excellent

TRAD TIONS

"THIS CENTER IS IMMENSELY VALUABLE IN THAT IT WILL PRESERVE SO MUCH OF WHAT HAS SLIPPED AWAY FROM US IN EASTERN NORTH CAROLINA."

–Paul O'Neal

Exhibits at the Outer Banks center range from a coastal marsh and outboard motors (top) to fishing artifacts (middle). Activities for children and adults already were taking place prior to the building's official opening.

waterfowl hunting on Currituck Sound. They built the 21,000-square-foot "cottage by the sound" for $385,000. When the Knights died in 1936, the house passed through a series of owners and uses until it was left to the elements in the 1970s. In 1992, Currituck County bought the property and restored it at a cost of more than $5 million. Volunteers conduct tours through the home daily, telling the story of the Knights and local people who worked there.

Some 100,000 people a year climb the lighthouse, and even more visit but don't make the climb up the spiraling stairs. From the top of the 162-foot structure, visitors get a panoramic view of the beach and ocean to the east, the coastline to the north and south and Currituck Sound to the west. The Outer Banks Conservationists, a nonprofit group, opened the lighthouse to the public in 1991. Nearby, visitors also can visit the restored lighthouse keeper's house.

NATURE CLOSE AT HAND

Corolla draws thousands of tourists each week in high season, but for most of the 20th century it was a quiet, remote village where people made their livings from the sea and the sound. The center's main building itself reflects that heritage. Constructed off the ground on large pilings to ride out high water, its architecture is reminiscent of the old lifesaving stations once prevalent along the coastline.

The center has offered wildlife and photography classes since 2002. The programs and nature film screenings are free, but reservations are required for most workshops. In a few minutes, Buckler can be pointing out the difference between raccoon tracks and opossum tracks in his class on finding animal trails. His nature photography classes often follow a boardwalk a few hundred feet long that winds first through maritime forest, then through a freshwater marsh before reaching out into the Currituck Sound. Buckler himself is often out there, lugging a camera with a huge telephoto lens.

One spring afternoon, it took only a few minutes to disappear into low growing trees that form a sort of shady tunnel over the boardwalk. Yellow-rumped warblers flitted from limb to limb with short, high-pitched chirps. A mourning dove sat on the ground next to the boardwalk. As the forest gave way to the marsh, a deer trail about a foot wide passed under the boardwalk and through the black needle rush and cord grass.

One of the most popular classes is the herp hunt, a search for reptiles and amphibians. This group looks for lizards, turtles, frogs and even snakes on purpose—and finds them. "We see water moccasins [cottonmouths] all the time," Buckler said. During one hunt, the group watched for a couple of hours as nine cottonmouths, a venomous species common on the North Carolina coast, swam along the shoreline. Of course, the group remained a safe distance away.

Sign up for a class on crabbing, or do it on your own. Sitting in the afternoon sun, families spend hours dangling a chicken neck tied to a string into the shallow water. Blue crabs grab the bait and usually hang on long enough to be pulled from the water and scooped into a net.

"We have enjoyed every class we've taken," said Pete Tucker, who with his wife, Polly, moved to Corolla five years ago after retiring from a 40-year career in sales. "The one I enjoyed the most was the duck carving class." Under the direction of Chandler Sawyer, an educator with the wildlife center, Tucker carved his first duck decoy, a scaup, more commonly known as a bluebill in these parts. Tucker has since bought supplies to carve more ducks. "I may be taking up a new hobby," he said.

A TRADITION OF DECOYS

Sawyer, a Currituck native, comes from a long line of hunters and carvers. Not only does he teach simple decoy carving to his classes, he does it as a professional and is knowledgeable on the wildlife center's collection of about 250 decoys. In 1994, the Whalehead Preservation Trust bought the collection of Neal Conoley Jr., executive director of the North Carolina Aquarium Society and author of "Waterfowl Heritage: North Carolina's Decoys and Gunning Lore." That collection is now on loan to the education center.

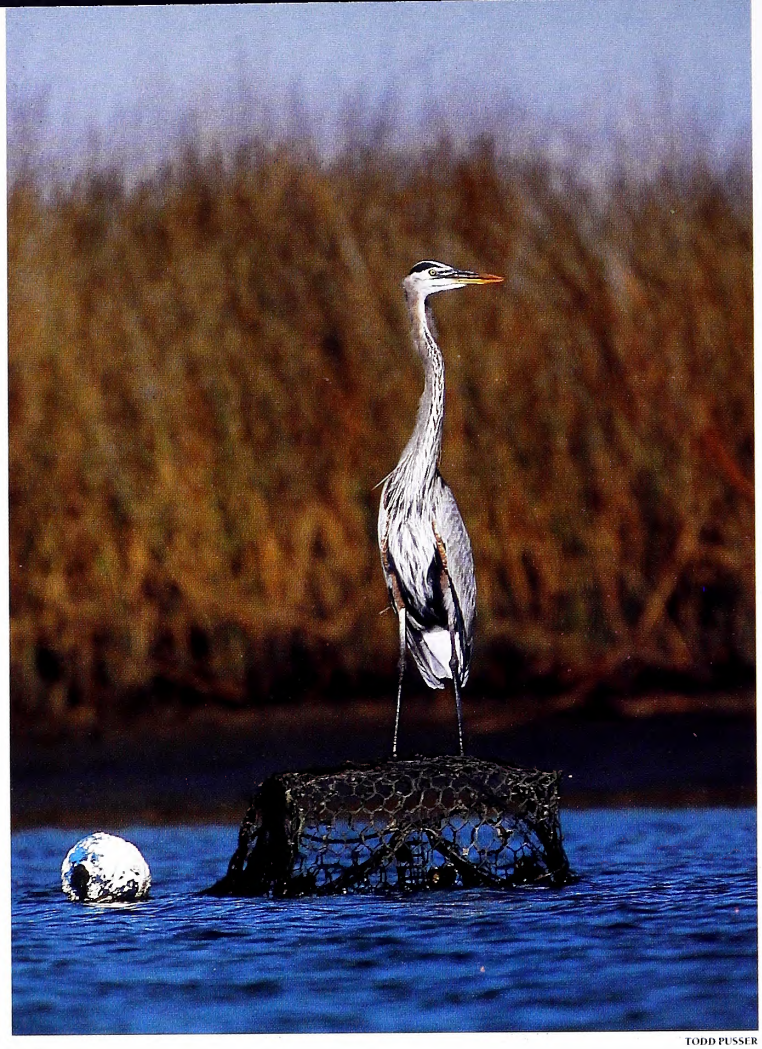
Conoley began collecting decoys in 1967 while he was in college. He visited the shops of some of the remaining carvers when he came east for duck hunting. When hunting season was slow, he'd hang around old-time carvers to talk. He bought a few bird decoys for as little as $10 simply because he liked them, not fully knowing what he was getting. Waterfowl decoy collecting didn't become an expensive, nationwide hobby until about 10 years later.

Old carvers didn't intend the decoys to be works of art, they were for making a living, Sawyer said. They sawed out a block of juniper, rough-shaped it with a hatchet and refined it a little with a wood rasp and a spoke shave. Juniper was light, easy to carve and durable. The idea was to get a big stand of decoys to attract more ducks. "They didn't care about how pretty they looked," Sawyer said. "They just wanted to bring in the ducks."

Hunting guides handled the decoys roughly, grabbing them by the heads and tossing them in and out of the boat. The decoys were often larger than life-size to be better seen by fast-flying ducks at long distances.

The collection is representative of several of the region's decoy makers, each with his own style. Alvirah Wright of Camden, Joe Hayman of Coinjock, Bob Morse and Ned Burgess of Churches Island and Cecil Stevens of Knotts Island are among the carvers represented. The oldest decoy in the collection is a rare ruddy duck made in 1885 by John Williams of Knotts Island.

Educator Chandler Sawyer, great-grandson of noted decoy carver Bob Morse, brings the Currituck tradition alive in his carving classes.



TODD PUSSER

TODD PUSSER

Wildlife is plentiful on the Outer Banks. In the sound, a great blue heron hunts from a crab pot, while a Carolina water snake wriggles across the sand.

Burgess, who died more than 40 years ago, is among the most famous of the decoy makers in the state. He worked from his shop with hand tools, elegantly crafting the wood even though he had only one good eye. Many collectors consider Burgess' decoys to be the most stylish of the time. Some writers have marveled how Burgess could have incorporated art deco techniques into his carving when he lived in Currituck County without much outside influence. Burgess sold some of his decoys for as little as 25 cents apiece. Now they are worth thousands of dollars.

Sawyer is the great-grandson of Morse, the renowned carver who lived just across the sound from the education center, and carves decoys for sale. Sawyer uses a band saw to cut out some of his decoys, but he also reverts to the old methods of chopping the rough shape with a hatchet and smoothing it out with a rasp and spoke shave. "I like it because it's old-school," he said.

HERITAGE ON DISPLAY

Many of the exhibits include authentic pieces of hunting and fishing gear from when waterfowl migrated to the North Carolina coast by the millions and fish filled the sound. Even the replicas were built by local boat builders. Milfred Austin, an 81-year-old native of Currituck County, built two models of a Currituck skiff — one 20 inches long and the other 4 feet long — for display at the education center.

The Currituck skiffs, made with flat bottoms, could float in water only a few inches deep, just right for maneuvering around the shallow shorelines and creeks of the sound. Most often, the skiffs were used for waterfowl hunting, which at one time was big business in the Currituck area.

The skiffs slipped easily into blinds made by sticking thick, green pine limbs into a wooden frame firmly attached to the bottom of the sound. Hundreds of blinds dotted the Currituck Sound. They still do. Guides could also fit the skiffs with a light wooden frame made to hold pine limbs, converting the boat itself into what was called a float blind. The boat displays will feature 12 to 15 miniature models of vessels used to hunt and fish on the eastern sounds.

"This center is immensely valuable in that it will preserve so much of what has slipped away from us in eastern North Carolina," said Paul O'Neal, chairman of the Currituck County Board of Commissioners. His family has hunted and fished the local waters for generations. "We're very excited."

Within the exhibit hall is a diorama of a marsh, a duck blind and a 12,000-gallon aquarium that is home to native aquatic species. The Wild Store offers the typical supply of T-shirts and hats, but also items not normally available in a tourist stop, such as decoys that look much like those made years ago by the hunters of the area. A 20-minute film that shares the title of the hall's exhibit "Life By Water's Rhythms," shows regularly each day in the auditorium.

Exhibits interpret the region's wildlife, the Atlantic Flyway, the people, and the boats and gear they used to make a living fishing and hunting on the sounds. One display focuses on the sink box. Hunters hid in the wooden compartments just below the water surface until waterfowl flew overhead. Sitting among the decoys, the sink boxes were so effective that they eventually were outlawed.

The education center in Corolla is one of three operated by the N.C. Wildlife Resources Commission. The Pisgah Center for Wildlife Education near Brevard offers classes on fishing and stream ecology in the Mountain region. The Centennial Campus Center for Wildlife Education is on the N.C. State University campus in Raleigh. The center's exhibits, scheduled to open late 2006, focus on the Piedmont region. ◆

Jeffrey Hampton writes about the Outer Banks for The Virginian-Pilot *in Norfolk, Va.*

OUTER BANKS CENTER FOR WILDLIFE EDUCATION
At A Glance

Exhibits:

- Life-size migratory waterfowl suspended overhead and animal mounts representative of local wildlife, including black bear, deer, fox and raccoon
- One dugout canoe used by American Indians in northeast North Carolina
- A recreated marsh scene, featuring a 12,000-gallon capacity aquarium
- 250 hand-carved wooden decoys, valued at $1.5 million
- 250-person capacity auditorium
- 22 vintage outboard motors
- A reconstructed hunter's blind
- One 1880 Elliptical stern canoe
- 5 "shove poles," used to propel Currituck skiffs through shallow water
- A "sit down box," which hid hunters while waterfowl hunting
- 25 large scale models of traditional boats used in the region for hunting, fishing and transportation
  Included are a quarter-scale model of a Currituck skiff and a radio-controlled motor launch, circa 1940s

Operating hours:

Open daily 10 a.m.–6 p.m. (April through October);
9 a.m.–5 p.m. (November through March)

Location:

On N.C. 12 north, the OUTER BANKS CENTER FOR WILDLIFE EDUCATION is between two historic structures at Currituck Heritage Park in Corolla: the Whalehead Club and the Currituck Beach Lighthouse. The Whalehead Club is a restored 1920s building that served as a residence and hunt club. The lighthouse was built in 1875. Its beacon can be seen up to 18 miles away.

Facility size:

A 22,000-square-foot building on a 3-acre site, along with a 950-foot boardwalk through a maritime forest, a marsh and into Currituck Sound, a pavilion and historic boathouse and boat dock.

Costs:

$6 million (construction $4.5 million and exhibits $1.5 million), funded by the N.C. Wildlife Resources Commission. Some of the exhibits were donated or provided on long-term loan from the community, the Currituck Wildlife Guild and the Whalehead Preservation Trust.

Other centers for wildlife education:

- PISGAH CENTER FOR WILDLIFE EDUCATION is located south of Asheville, near Brevard and adjacent to Pisgah National Forest.
- CENTENNIAL CAMPUS CENTER FOR WILDLIFE EDUCATION and Wildlife Resources Commission headquarters is located on the Centennial Campus of N.C. State University in Raleigh.

The showy lion's mane jellyfish, the world's largest jellyfish species, is found most commonly in North Carolina waters during the winter months.

STEPHEN JONES / IMAGEQUESTMARINE.COM

Gelatinous GEMS

FASCINATING CREATURES WITH AMAZING ADAPTATIONS, NORTH CAROLINA'S JELLYFISH ARE MORE THAN JUST STINGING THREATS TO SWIMMERS.

They are pulsating, gossamer jewels of the sea; brainless creatures; the kings of sting; plankton drifters. There are more than 200 known species, and yet they remain phantoms to most people, including Atlantic coast residents. Their fragile, luminous beauty makes them a popular subject for underwater photographers. That they are variously known as edible delicacies, threats to fisheries, beach nuisances, household pets and dangerous killers adds all the more interest.

"Jellyfish" is the name commonly given to any organism that is pelagic (lives in the open ocean), consists mostly of water and has a jelly-like consistency. Actually, jellyfish are not made of jelly at all. Their gelatinous appearance comes from protective skins that are filled with a substance that is approximately 95 percent water. Muscle fibers laced through the jellyfish's strange body hold the creature together.

These creatures are not "fish" at all. Rather, they are invertebrates that are related to sea anemones. A jelly has no head, brain, heart, eyes, ears or bones. But that's no problem for them. Jellyfish might seem capable of melting away on a North Carolina beach, but actually they're not all that fragile. These marine organisms can, in fact, survive long sea journeys and considerable wave battering.

Jellyfish are marvelously well adapted to a drifting, predatory life in the ocean, gulf, sound, bay or saltwater inlet of any kind. Jellies get around by means of a unique pulsating action. Long ago, people called the creatures "sea lungs" because their rhythmic movements through water somewhat resemble human breathing patterns. Their habitat is usually coastal waters, but they also live in the open ocean as well as freshwater lakes and streams. Jellyfish drift individually dispersed or in aggregations called "smacks" that are measured in acres or sometimes even square miles.

WRITTEN BY JOE ZENTNER

From top: The moon jellyfish, sea nettle and mushroom jellyfish are common N.C. species. Opposite page: cabbage head (or cannonball) jellyfish.

Many of these creatures resemble floating mushrooms, with long tentacles reaching underwater like weeping willow branches. Most true jellyfish have brightly colored tentacles—elongated, flexible protrusions that contain poisonous, stinging cells known as nematocysts that can pierce the skin. Other creatures with nematocysts include sea wasps, anemones and fire corals. These stinging organs can and do function long after the animal has died.

The person who once described jellyfish as "little more than organized water" had her or his facts about right, but could have been a bit more positive about these fascinating creatures. Found in all the world's oceans, jellies often are seen near the surface of the water during times of diminished light. Individuals range from fingernail-sized to creatures that would more than overflow a bushel basket.

Jellyfish can be useful. Some species are harvested and dried for human consumption, mainly in Asia. Many sea turtles, including the endangered loggerhead, feed heavily on jellyfish. Several fishes, including chum salmon, Atlantic mackerel and cod, also eat jellyfish.

North Carolina's jellies

Jellyfish have long inspired individuals who have seen them up close in the wild. Explorer William Beebe, who in the early 1930s dived deeper than anyone ever had before, had great affection for the jellies that he saw and studied. In his book "Nonsuch: Land of Water," Beebe describes a group of what are known as moon jellyfish: "I swiveled half a circle and entered a galaxy—an entire constellation of great jellyfish all around me. Moons they were, all more than a foot across throbbed around me, set at various angles, each with bright pink loops at its center—egg-masses. There came to me a profound feeling of the permanence of the evanescent: these [creatures] filling the ocean in great numbers, each jelly perfect."

THE PERSON WHO ONCE DESCRIBED jellyfish AS "little more than organized water" HAD HER OR HIS FACTS ABOUT RIGHT, BUT COULD HAVE BEEN A BIT MORE POSITIVE ABOUT THESE fascinating creatures.

The moon jellyfish, *Aurelia aurita*, is named for its moonlike shape and translucent white colors. Often found in enormous smacks, the moon is the jellyfish most commonly seen washed up on beaches. It thrives in North Carolina waters from April to early November, depending on water temperature and oceanic currents.

The moon jellyfish has short, fine tentacles descending from the rim of its body. The body, which is known as an umbrella, may be as much as 18 inches across and gives the creature the appearance of a flying saucer. Visible on top of the moon's umbrella are four purple horseshoe shapes which are part of its reproductive system. Four frilly oral arms hang underneath its body, surrounding its mouth. The oral arms help manipulate food and serve as a home for developing larvae.

The sea nettle, *Chrysaora quinquecirrha*, is about the same size as a moon jelly, but its umbrella may be pale white and may resemble the spokes of a wheel. It is also commonly found along the North Carolina coast during the summer months. It is distinct from the moon jelly in that its oral arms are longer and it has fewer, yet longer, tentacles.

The mushroom jellyfish, *Rhopilema verrilli*, is found in our state between July and November and occasionally enters sounds and estuaries. The mushroom can grow as large as 14 inches in diameter and is exceptionally fragile, breaking easily if lifted out of the water. It has no tentacles on its umbrella. Instead, its fingerlike oral arms extend down from the center of its umbrella and contain hairlike cilia that sweep plankton into its mouth.

Have you ever thought about eating a peanut butter and jellyfish sandwich? The cabbage head jelly, *Stomolophus meleagris*, is a popular menu item in some parts of the world. According to some people, the cabbage head is not only delicious, but also low in fat and calories. Other diners claim it tastes remarkably like rubber. The cabbage head is also known as the cannonball or jellybomb.

Like the mushroom, it has no tentacles. Its short oral arms extend just below the edge of its umbrella, which reaches 8 to 10 inches in diameter and is bordered with brown pigment. Its scientific name means "many mouthed hunter." It is abundant during summer in both North Carolina sounds and ocean waters.

Not only is the lion's mane jelly, *Cyanea capillata*, famed as the world's largest jellyfish (its bell can measure 8 feet across and its tentacles reach lengths of 100 feet), but the creature played an important role as the villain in Arthur Conan Doyle's Sherlock Holmes story "The Adventure of the Lion's Mane." Luckily for swimmers stung by this jelly, as I have been, outside the pages of Doyle's tale, death rarely results. The lion's mane, which feeds on plankton, fish and moon jellyfish, is common in the state's waters from October to May.

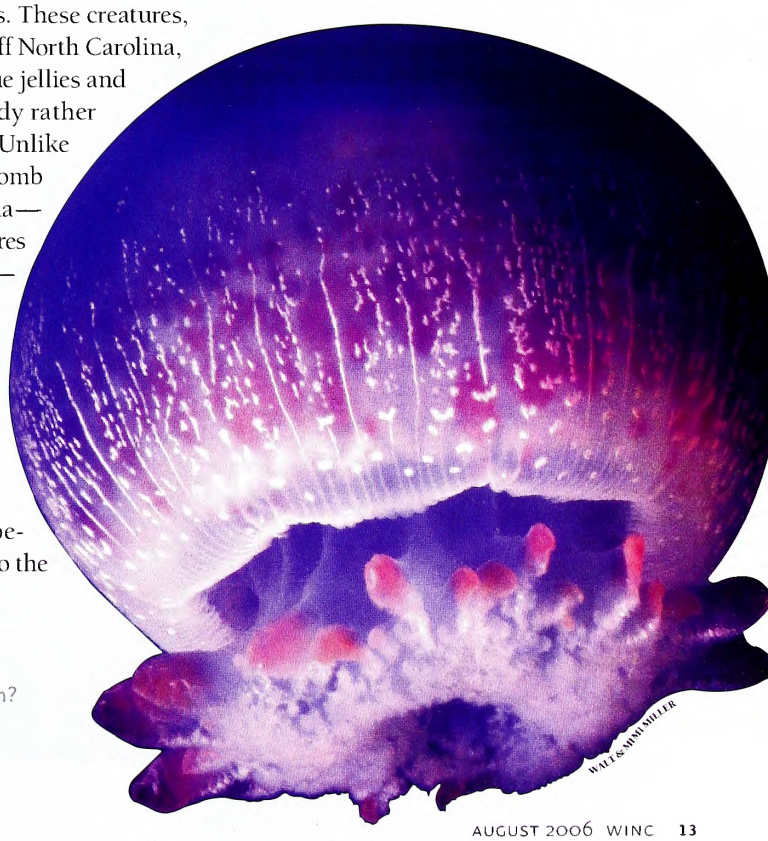
When are jellies not really jellyfish at all? When they're comb jellies. These creatures, plentiful in the deep sea off North Carolina, are distantly related to true jellies and have a solid, egg-like body rather than a bell and tentacles. Unlike their pulsating cousins, comb jellies use their rows of cilia—microscopic hairlike features that resemble tiny combs—to paddle through water and move food towards the mouth.

The much-feared Portuguese man-of-war, *Physalia physalis*, is not a true jellyfish at all, but a colony of four different specialized creatures related to the fire coral. It is a gas-filled floating bladder that supports three types of polyps, each with a different function—sensing and capturing prey, feeding and reproduction. The group of polyps trails tentacles that may be as long as 150 feet. Strong winds may blow the man-of-war inshore in summer or early fall.

Jellyfish as pets?

These marine organisms are certainly among the most fascinating creatures of the sea. It's little wonder, then, that many public aquariums, big and small, either have displayed jellies, currently display them, or intend to display them sometime in the future. Likewise, some hobbyists envision a home aquarium filled with glowing gelatinous orbs.

This is a more difficult proposition than one might imagine. There are dozens of ways to accidentally kill captive jellyfish, and a relatively strict set of guidelines for keeping



WALT & MIMI MILLER

NATURE'S WAYS
How Do Jellyfish Find Their Way With No Brain?
See Nature's Ways, page 39.

BASIC FIRST AID FOR JELLYFISH STINGS

+ Carefully remove any remaining tentacles. Do not rub the area with sand, because rough treatment could result in additional stings.
+ Wash the injured area with diluted ammonia or vinegar.
+ If symptoms are severe, such as respiratory distress, muscle cramps or dizziness, seek medical attention immediately.

RESOURCES FOR JELLYFISH HOBBYISTS

www.jellieszone.com
www.masla.com/jellyfish.html

them alive. Anyone who aims to keep jellyfish in his home would be well advised to research the topic thoroughly beforehand.

That said, the moon jelly is perhaps the easiest species to maintain. Primarily a cold-water species, moons do best at the low end of room temperature. If your home is located in a fairly cool clime, or is air-conditioned during the summer, these creatures generally can survive.

The chief obstacle facing a person who is considering a jellyfish aquarium involves obtaining them. With a few exceptions, you can forget about purchasing jellies from a tropical fish dealer. You may possibly encounter several species for sale at well-stocked aquarium shops or some larger wholesalers.

With a boat and the proper tools, it is possible to collect jellies from the ocean. Timing is important as well. Jellyfish are notorious transients—present in hordes one day, gone the next. A collector can never be certain that jellies will be seen on an ocean excursion. If you can hit the water on a regular basis, look for surface slicks where many drifting objects tend to congregate. If you can't get out in a boat, you may find jellies drifting in waters that surround harbor docks.

Once spotted, small jellyfish are usually not too difficult to capture. It is important to keep jellyfish supported in water at all times—collecting with a net or any other method that takes away water support, even if only briefly, may severely damage delicate jellyfish. If not done exactly right, they collapse into a gelatinous glob that may or may not recover when returned to a suitable aqueous environment. The ideal way to collect is to gently scoop the creature from the sea into a water-filled jar.

Cups, beakers, strong plastic bags or buckets can all be used if you gently surround a jelly with the container and then lift it out of the water. This is easier to accomplish when a jellyfish is on the surface. After collection, the animal can be placed in a large container.

Aquarium setup and feeding

Successfully maintaining captive jellies requires abandoning any preconceived ideas you may have about keeping fish. If you had a tank with limitless volume and no solid boundaries, you would have an ideal environment for jellyfish. However, only an ocean can meet this lofty ideal.

Several tank system designs have been developed that enable some species of jellies to thrive in captivity. A key concept in such designs is to have incoming water directed across a screen through which water exits the tank. This provides a circular flow that keeps jellyfish suspended and allows water to move without a pump sucking up and killing jellies. A large screen area helps to reduce the outflow at any specific point and thereby minimizes the chance that a gelatinous creature will become hopelessly stuck.

A daily jellyfish routine should include an assessment of the health and appearance of each individual. Lesions may result from injury incurred during aquarium maintenance, or from abrasions caused by rubbing against fouled screens. Tank cleaning should be done carefully with cleaning pads made

IF YOU HAD A tank with limitless volume AND NO SOLID BOUNDARIES, YOU WOULD HAVE AN ideal environment FOR jellyfish. HOWEVER, ONLY AN ocean CAN MEET THIS lofty ideal.

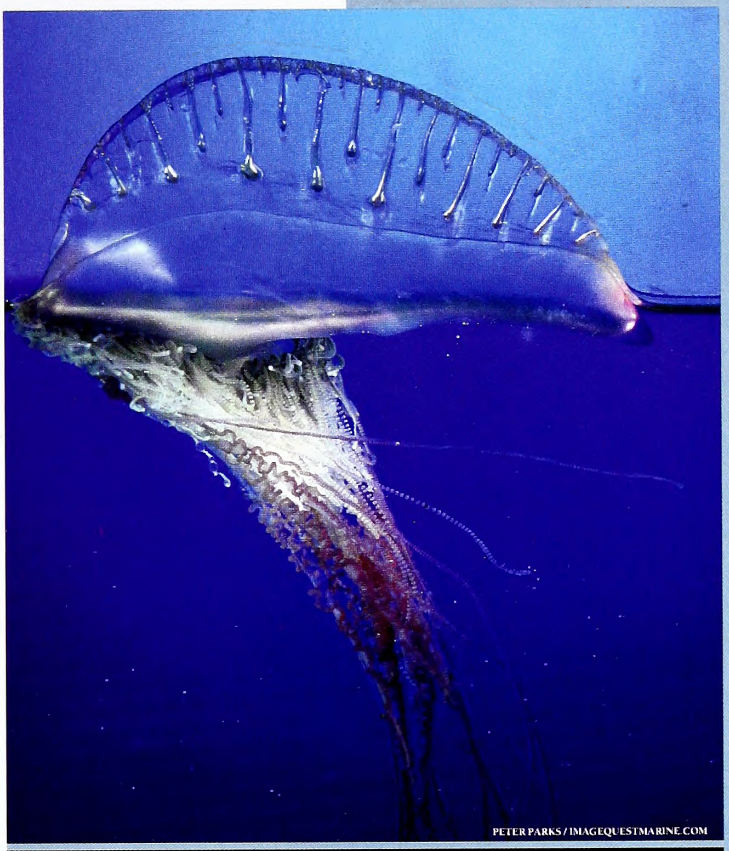
From top: Portuguese man-of-war, ovate comb jellyfish and captive jellies in a special cylindrical tank designed to keep the creatures suspended in the water column.

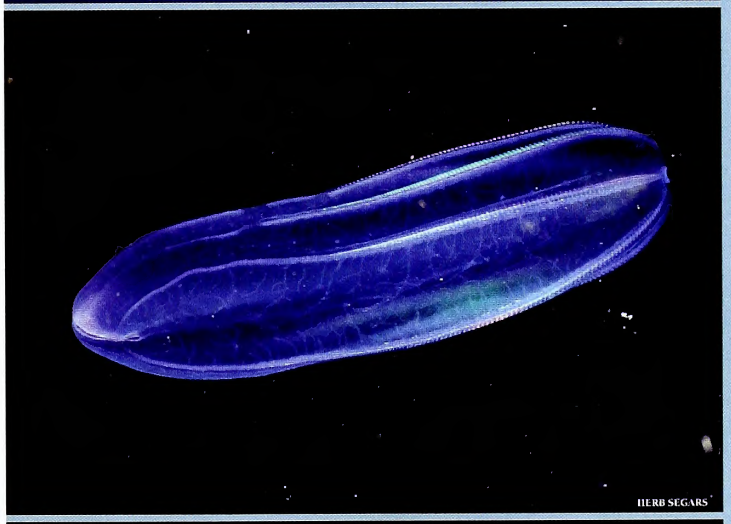
especially for use on acrylic. Even a slight bump with a hand could damage fragile gelatinous tissue. And of course, prevent personal injury by avoiding jellyfish tentacles during maintenance.

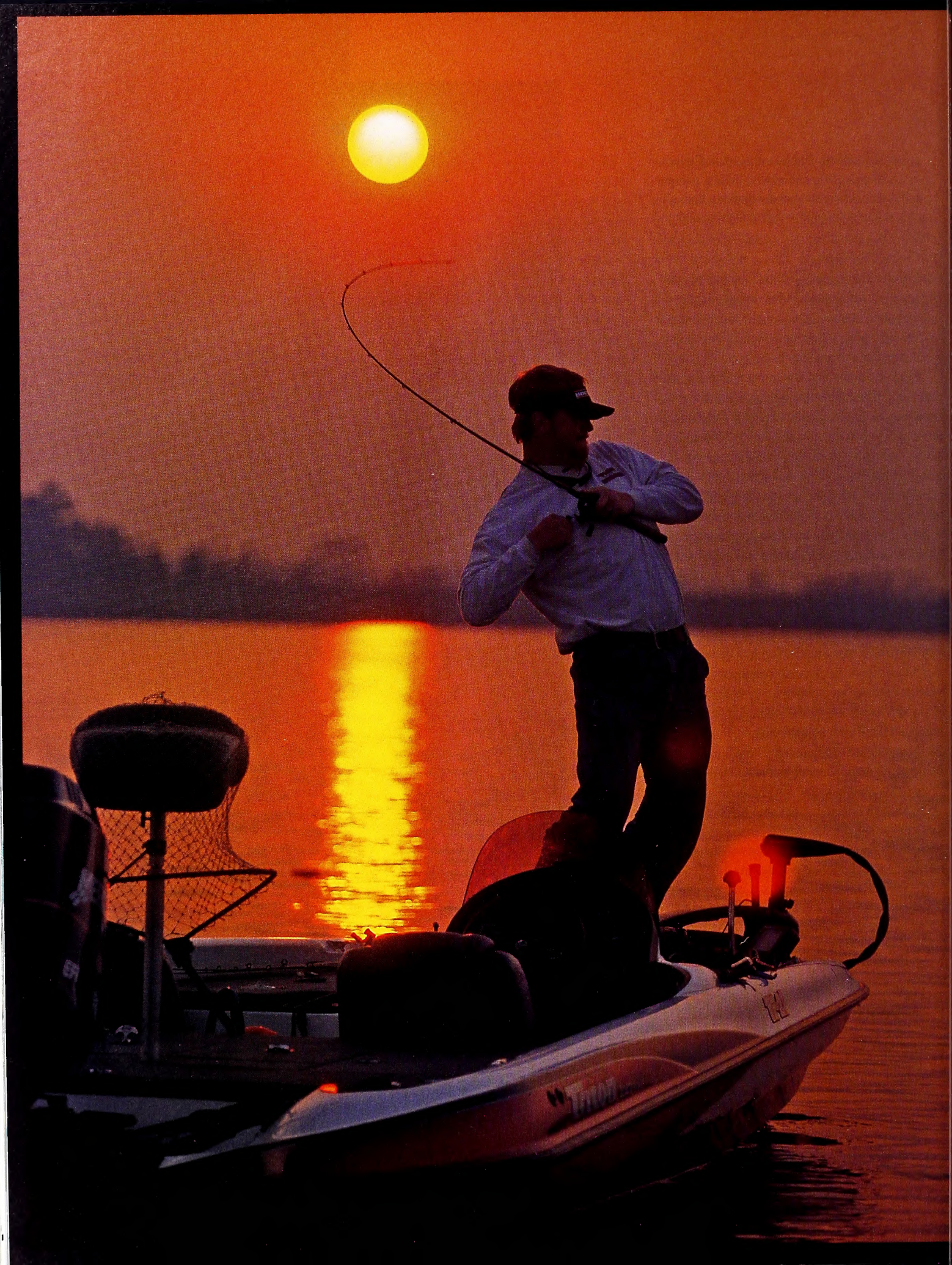
What does an aquarium enthusiast feed captive jellies? Jellyfish are predators that require live prey, at least occasionally. Brine shrimp are best for speeding growth and prolonging life. Krill, an abundant group of crustaceans found in cool water, is also an excellent food source for jellyfish. It doesn't even need to be alive—freshly thawed krill works fine. Another feeding approach is to blend fish, clams, shrimp and any other readily available seafood into a fine paste using a blender. The resulting slurry can be strained with a coarse net to remove large chunks.

Jellyfish are among the marvels of the animal kingdom. Amazing denizens of a watery world, jellyfish are unmatched in style and beauty when viewed in their natural habitat or in a properly set up home aquarium. With care, jellyfish can bring endless hours of fascination and enjoyment to you and your family. Enjoy, but be careful when playing in North Carolina coastal waters.

Joe Zentner is a retired professor and freelance writer who lives in Cary. The N.C. Aquariums provided some text for this story.







lighten UP

SOMETIMES IT'S BEST TO LEAVE THE HEAVY ARTILLERY AT HOME AND FINESSE BASS INTO THE BOAT.

written and photographed by **David Hart**

Bigger isn't always better in bass fishing. Using small lures on light tackle can sometimes tempt a big largemouth to strike.

It's not that Ray Scott has anything against big lures and heavy tackle. As the founder of Bass Anglers Sportsmen's Society, better known as BASS, Scott has seen the sport of bass fishing evolve into highly specialized pursuit where professional anglers fish fast and big, throwing large lures while covering lots of water in an attempt to catch five big bass. Recreational anglers have followed suit. Their goal is to catch lots of quality bass, but truth is, most don't. That evolution, says Scott, has in many ways taken the fun out of bass fishing.

"There just isn't any challenge in wrestling a 2-pound bass out of the water with 17-pound line and a broomstick rod," he says. "It's just not as fun as it could be."

To prove his point, Scott invited four of the country's top professional bass anglers —Paul Elias, Ken Cook, Roland Martin and Davy Hite— to his 55-acre lake in Alabama for a fun tournament in which the four contestants were limited to light-action rods loaded with 4-pound-test monofilament. The rules were pretty simple.

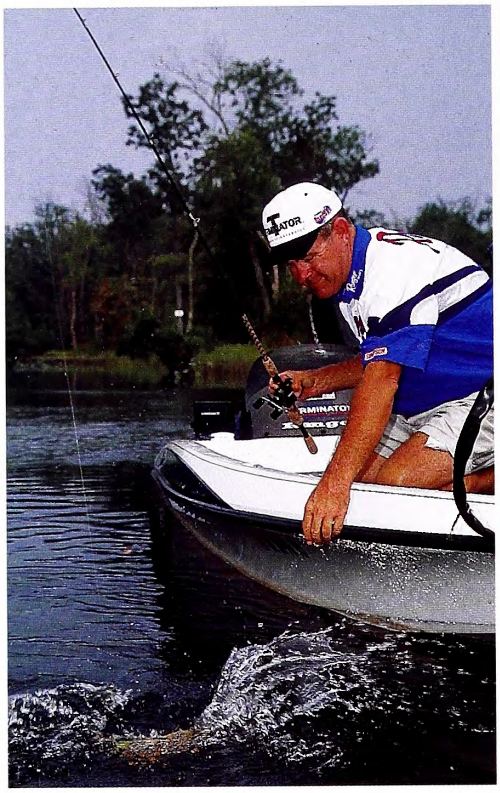
"They could use any lure they wanted to, but most of them fished real small lures, 4-inch worms, 1/8-ounce jigs, that sort of thing, and I tell you what, those guys had a ball. Not only did they catch a whole bunch of fish, they caught some big ones, too," recalls Scott. "The biggest was nearly 8 pounds, and the average weight of all their fish was 5 pounds. They broke quite a few off, as well, but I can't recall watching four grown men have so much fun."

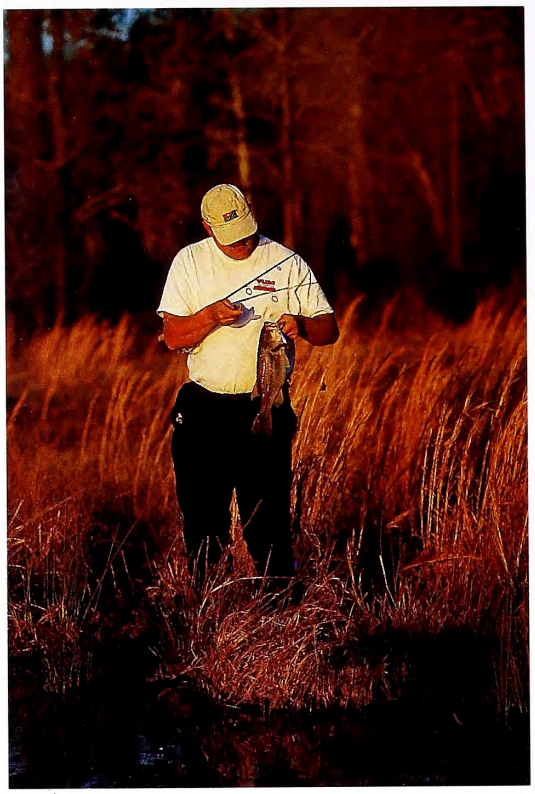
Scott's ultimate vision was to start a tournament trail that limited anglers to nothing but 4-pound line, which ultimately meant small baits as well. While many of his ventures in bass fishing were immediate hits, this one has yet to make waves in either the professional or recreational fishing arena. Too bad. Using small lures and light tackle, often called finesse fishing by dedicated bass anglers, isn't a tactic reserved for those burned out on chucking hand-sized spinnerbaits and crankbaits big enough to choke an alligator. Nor are they relegated to bass anglers who seek a challenge equivalent to bow hunting for deer. Scaled-down baits actually work better than big lures in a variety of situations.

The Numbers Game

All bass anglers enjoy time on the water, even if they don't catch any fish, but when push comes to shove, bass fishing is all about, well, catching bass. Some anglers pursue big ones, using spinnerbaits as big as hubcaps, 10-inch Texas-rigged worms and other lures and tactics that smaller bass tend to shun. And for most of those big bass hunters, catching one 5-pounder in a single day is the epitome of success. But 5-pounders are as rare as a heads-up penny lying in the street.

Even the pros have a tough time catching big bass. The results of the 2004 Bassmaster Classic held on Lake Wylie offer a glimpse into the real challenge of finding tackle-testing largemouths. The average weight of the 423 bass brought to the weigh-in stage during that three-day event was only 2.2 pounds.





Most big bass lures, including crankbaits and spinnerbaits, come in smaller versions that can be attractive to both large and small bass. Soft stickbaits and finesse worms can be particularly effective.

The 1998 Classic, held on High Rock Lake, produced an average weight of less than 2.5 pounds. Sure, there were some big fish caught and the winning pro raked in a cool $200,000. Those who fish for a living pay their bills by catching big bass.

For others, however, success is measured by a different number, not how big, but how many, a fact not lost on parents of young children just learning to fish. Kids love to catch fish, and while even beginning bass anglers would rather land a 10-pounder over a 10-incher, numbers usually trump size every time. Small baits are the ideal ingredient for those more concerned about steady action than with spending a day chucking baits big enough to anchor a bass boat. Even professional anglers agree that the key to consistent success is to catch five bass—a typical legal limit—every time, no matter how big those fish are.

Downsized Lures

One of the most effective places to scale down is on lakes that receive heavy fishing pressure. Waters like High Rock, Lake Norman and other popular reservoirs get fished hard throughout the spring and summer as anglers in rocket-fast boats race from one spot to the next, casting heavy jigs, 7-inch worms and egg-beater buzzbaits to docks and other visible targets. It's tough to find any public lake that doesn't receive lots of fishing pressure.

Bass anglers as a group fish the same few big lures, all tied to heavy line. Why shouldn't they? Most magazines dedicated to bass fishing focus on what professional bass anglers call "power fishing" techniques, using big baits and fast tactics to cover lots of water in a hurry. Bass, however, must certainly roll their eyes in indignation as yet another half-ounce spinnerbait speeds past. They've seen every full-size lure in your tacklebox a dozen times.

That's one reason why small lures are so effective. When was the last time you dropped a 3-inch soft stick bait or a 4-inch worm next to a stump? The soft splash of such small bait is something few bass have ever heard. Instead of racing for deeper water like they do when a big Texas-rigged worm crashes on the water, they just might come over for a look.

Little lures also tend to catch more bass on clear, spring-fed ponds and the deep, rocky reservoirs typical of western North Carolina. That clear water gives bass an extra moment to study a lure, and they are far more likely to shun gaudy, oversized bait than a smaller one.

Match The Hatch

For every big bass bait there are smaller versions of that same lure hanging on a tackle store shelf, likely gathering a thin layer of dust as anglers reach for the bigger version. Despite Ray Scott's plea for a return to simpler times, bass anglers still think big.

Most of us, however, didn't start out that way. Remember those days when you walked the banks of a neighborhood pond, peering into the water as the fish cautiously looked back at you? You'd kick the tall grass, hunting the cover for an unsuspecting grasshopper that you'd hurl as far out into the water as you could. Inevitably, the grasshopper would make a few frantic kicks toward shore before it disappeared in a swirl, readily eaten by the same fish that wouldn't touch the lure you cast and cast.

No fish can resist such a tempting, easy meal as a small grasshopper or frog. That's why small surface lures that resemble insects and other natural forage are killer baits for all sizes of largemouths. No, a 10-pounder probably won't bother to slurp a grasshopper off the surface, but plenty of 2- and 3-pounders just might, and all the 10-inchers in the lake can't seem to resist a tasty morsel like a bug struggling on the surface. There are a number of small lures that do a fine job of imitating an insect or some other small prey rippling

the surface or swimming below it. Rebel offers several, including the Crickhopper, a tiny grasshopper imitation; the Bumblebug, which has clear wings similar to a locust or a big hornet; and the Creek Creature, a 1½-inch catfish imitation. Even scaled-down crankbaits entice bass that might otherwise shun a full-size lure. There are countless small crankbaits available in dozens of different colors and patterns. In many cases they actually mimic real bass food better than most full-size crankbaits. Shad and small bluegills are the preferred forage for largemouth bass, and for much of the spring and summer, they only average an inch or two.

Bass, of course, are somewhat less sophisticated than wild trout, and they will readily eat something that doesn't look anything at all like a real creature. You don't have to match their forage all the time. That's why it's perfectly acceptable to tie on a 3-inch soft stickbait, a slim piece of rubber that tapers on both ends. Soft stickbaits—Yamamoto Senkos, Yum Dingers and a host of other brands—come in a variety of colors, and bass will eat all of the hues at one time or another. In fact, these lures are perhaps the best all-purpose bass baits. They'll catch fish when nothing else will, despite their unrealistic appearance.

Finesse worms, any 4-inch plastic worm, are also fantastic baits when fishing pressure is high. So are ⅛-ounce jigs, 2- and 3-inch minnow-shaped jerkbaits and tiny spinnerbaits and grubs. There really is no limit to the selection of lures available for light-action bass fishing. They may be small, but they catch plenty of bass.

Tackle Logic

Although Ray Scott wants to see professional anglers compete with 4-pound monofilament, you can certainly use heavier line. You should, but don't go too heavy. Lighter line is suppler than thicker mono. That means 8-pound line will cast a tiny crankbait or worm much farther and more accurately than 17- or even 12-pound line. So what's the right line? Ten is about the maximum diameter for most light baits and finesse techniques, but 8 is a good all-purpose diameter. Lighter line is less visible to the fish as well, making it mandatory for clear water.

Eight-pound monofilament may be ideal for most small baits, but it is critical that you tie strong knots and check your line for any sign of abrasion. Professional anglers favor heavy line because it is far more forgiving than thin monofilament. Their livelihoods depend on getting bass out of the water and into their boats in a hurry. A small nick in 25-pound monofilament probably won't cost them a fish like a nick in 10-pound line will. Run your fingers up and down the first 3 feet of the line, checking for the slightest sign of abrasion. If you feel any, cut the line and retie the lure.

To deliver small lures on light line, you need lighter rods and reels to match. On the other hand, whippy 5-foot ultralight rods may cast a 4-inch worm farther than a 6-foot, medium-heavy stick, but it just won't provide the backbone necessary to set the hook on a 2-pound bass. A 6-foot, medium-action graphite spinning rod with a matching reel loaded with 8-pound line is the perfect combination for most light-lure applications. It can deliver topwaters and finesse worms with pinpoint accuracy and it will give you just enough power to set the hook. That's when the fun really begins. A 4-pound bass will put up a monumental fight on a light rod, and how you handle the fish will determine whether you get to touch it. Rush the battle and there's a good chance you'll lose the fish, but the flex of a medium-action rod will help you fight bass with less risk of losing them, essentially helping reduce the reduced strength of light line.

As those four professional anglers who took part in Scott's 4-pound-test tournament found, bass that weigh more than the line strength rating can be landed. It just takes a different touch, a different attitude and perhaps a smaller bait to coax them into biting. Small baits aren't just for kids. They work when nothing else will, something that can't be said of the big, flashy baits so common among bass anglers today. ◆

David Hart is a writer from Virginia and a frequent contributor to WINC.

Lures For Downsizing

1. CRANKBAIT
2. TWIN-BLADED SPINNERBAIT
3. TOP-WATER TORPEDO PLUG
4. CURLY TAIL GRUB
5. SOFT-PLASTIC SHAD
6. SOFT-PLASTIC TUBE
7. SOFT STICKBAIT
8. TOP-WATER POPPER
9. SKIRTED JIG
10. SOFT-PLASTIC CREATURE BAIT

From Pound to Pond

Can a rescued retriever learn to become a top-flight duck dog?

What was he thinking?

In his 1961 book "Gun Dog," Richard Wolters wrote: "An old dog that has been taught nothing can learn nothing." Just several years ago, I would have agreed, but now I have a different perspective after my experiences with an underdog (pun intended).

Riding home from work one February afternoon, I decided to get a dog. Being a newly initiated duck hunter, naturally a retriever was a must. Like a kite in a hurricane, my imagination took off. I pictured a super, supreme, deluxe model grand champion retriever named Molly. Also like a kite, my checking account sent my imagination crashing nose first into the ground. But instead of scrapping the idea, my plan took a detour along a more economical route, the local dog shelter. Yep, you heard right, I went to the dog pound, where many animals—including a goat—found themselves on this particular day.

Upon entering the shelter, my greeting consisted of every dog jumping and barking, frantic to be chosen, except one. In stark contrast to the chaos all around, one dog was lying on the floor, curled up in a ball of such pale yellow that her coat appeared white. A volunteer allowed me to spend some time with her in an area where potential adopters can acquaint themselves with a potential adoptee. Several minutes went by and the choice was made. Molly, presumed to be a 2-year-old yellow Labrador, was coming home with me. Since there was no history, her age and breed were merely educated guesses made by the shelter's staff.

written by Jonathan Hewitt • illustrated by Jim Brown

I quickly discovered that Molly had no retrieving instincts whatsoever. It didn't matter what was thrown, she wouldn't fetch it.

Let the Training Begin

Before training ever started, two very challenging logistical problems presented themselves. Molly needed to be trained and I didn't know how. She didn't know any commands, not even "SIT." Over the years a few commands had managed to stick in my memory, but training Molly to obey them was a different story. With the help of a few books and videos shipped from a friend in Louisiana, training commenced. One book stated that with only 15 minutes a day you too could have a well-behaved dog, so that's where I began. Looking back, two possible conclusions seemed reasonable for the 15-minute time limit. It was either to avoid boring Molly or to retain my sanity.

Regardless, 15 minutes per day was sufficient. The first lessons focused solely on "SIT," with the next few lessons focusing on "STAY." So far, so good, until a book informed me that if the "SIT" command is taught properly there is no need for a "STAY" command. Too late

now; there was no turning back. As a novice dog trainer (and I use the term "trainer" lightly) I had a thought. If our goal was to retrieve a bird, Molly's retrieving instinct should be tested. The brilliance of the idea was almost overwhelming. Just tossing tennis balls two or three times would tell me all about her instincts.

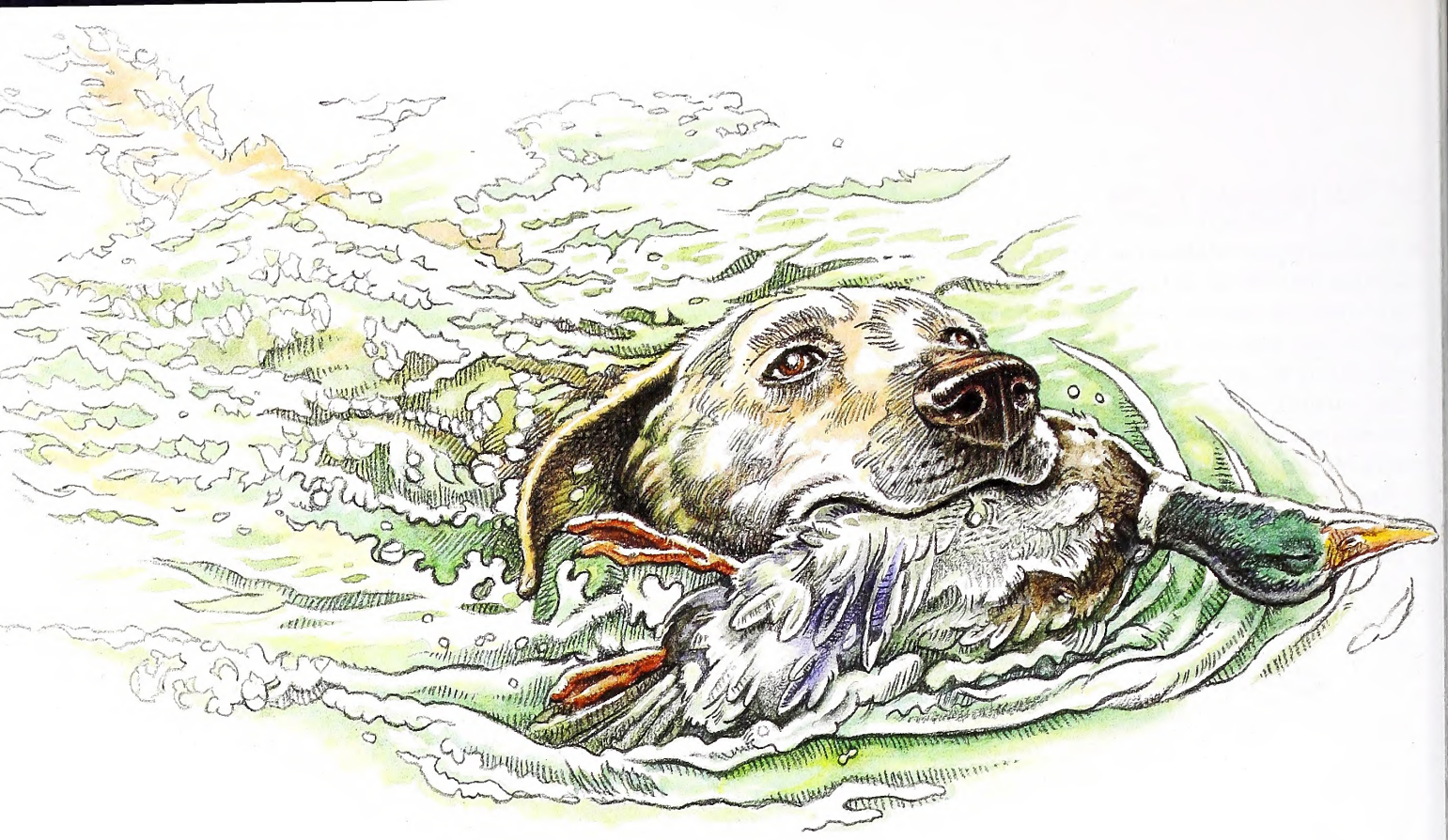
I quickly discovered that Molly had no retrieving instincts whatsoever. It didn't matter what was thrown, she wouldn't fetch it. Considering that my plan was to produce a grand champion retriever, her lack of instinct was a bit of an obstacle. A normal person with a good head on his shoulders would have decided that Molly would be a great pet but not a retriever. However, no one has accused me of being normal or having a good head on my shoulders. We continued to work on other commands, and every once in a while I would check to see if her instinct magically appeared. It didn't.

The 2003–2004 hunting season had come and gone with no hope in sight. The year spent as my own retriever appeared to be a foreshadowing of seasons yet to come. What seemed like many moons later, a glimmer of hope shone through when one of my friend's videos described a training technique called "force fetch." Why not, I thought. Let's give it a try. Molly didn't like the idea at first, but later realized it wasn't all that bad. To teach "FETCH," the video worked backward. First, teach her to hold something. Once she got the idea, she would hear the command "HOLD," and I would give her something to place in her mouth, anything from the TV remote to a retrieving dummy. The progression was to change the command from "HOLD" to "FETCH," gradually placing the dummy farther and farther away from her mouth. Before too long, she was retrieving within the confines of the backyard.

Shortly thereafter, we moved to retrieving in water, where her enthusiasm was nonexistent. Although her gusto was lacking, we made a beginning. By the next hunting season, she was retrieving in the water better than she was on land. She would swim out, retrieve the dummy mallard, bring it to my side, sit and hold the dummy in her mouth until she heard the command "RELEASE." She continued getting better, and through repetition grew increasingly successful.

Preseason Conditioning

Reading a duck hunting forum once, a fellow hunter referred to himself as "Triple Shot Joe" or something like that. I don't remember his name exactly. Someone wrote back and asked why he referred to himself as "Triple Shot." He replied something to the effect, "'Cause I like



to give two warning shots to let 'em know where I'm at." Most waterfowlers will understand the humor, thinking of their own three-shot blast that has occurred at some point.

Hunting is by no means the same as training. Molly had yet to get used to the sudden blast of the shotgun, and as indicated earlier, my bank account was not going to allow me to shoot cases of shells to get her accustomed to the noise. The original strategy was to get a toy cap gun, adding a dimension of realism to the training. The cap gun worked initially, but wasn't as real as it needed to be. Ah, another brilliant thought flashed before me. There was a skeet and trap range close to where we lived. Although money was needed to shoot clay targets, it cost nothing to stand nearby while Molly's ears became acquainted with the sound of shotgun blasts. At first she was unsure of the noise, but once she learned what it was, she didn't mind it.

Opening Day

On the first day of the season, I hunted the same pond where we conducted training sessions during the off-season. The familiarity could only help. Having done my scouting, I thought that a small group of wood ducks would be on the water by sunrise. The scenario was a jump-shooting style of hunt for two reasons: Molly needed to see the ducks take flight in hopes of fully awakening her ever-slumbering instinct, and she needed to observe the action in order to make the retrieve. Again, this assumes the scouting was done correctly and the shooter can hit the broad side of a barn.

At my command, Molly immediately swam to the bird, retrieved it and laid it at my feet. Her first retrieve. As her trainer and owner it was a great feeling.

Fortunately, luck was on our side. Up to now the plan had worked perfectly. Molly saw the explosion of ducks off the water, and one lucky shot later it was time to see what she could do. A year and a half of training came down to this moment. Once the command was given, would she know what to do, or would she send me wading into the water to retrieve the duck? Had I wasted my time?

At my command, Molly immediately swam to the bird, retrieved it and laid it at my feet. Her first retrieve. As her trainer and owner it was a great feeling to watch her work, but this was just the beginning. By the end of the season, Molly had made every retrieve with the exception of the last duck of the year, one she could not see down.

Yours truly played the retriever that day. Our training had to aim higher than mere retrieving. It was time to teach the teacher, and then teach the student how to mark birds and how to perform a blind retrieve using hand signals.

From the last day of duck season to the next opening day, we frequently worked on hand signals while continuing to reinforce old lessons, but the new lessons were not going well and I was uncertain whether the teacher or the student was to blame. My neighbors must have thought I was trying out as a traffic officer for the next local theater production whenever I was training with my fanatical hand waving. By chance, I threw out a dog treat and gave the hand signal toward its location. Surprisingly, she got it. From that moment and for the next few days, she was placed in a "SIT—STAY" posture and dog biscuits were placed at north, south, east and west. Before long, dog biscuits were replaced with retrieving dummies, and Molly was finding them hidden in the yard with the use of hand signals and her nose.

If you saw Molly today you'd never know she was once a stray who was picked up off the streets and put in the pound.

The Second Season

Where I come from, hunting stories like this are usually made up, but with my own eyes as her witness, Molly retrieved every bird last season, her second, and with enthusiasm. She batted a thousand. The last hunt of the year produced a situation similar to her first, except we were hunting in a swamp and the ducks were mallards. My hunting partner and I each had a mallard on the water. Molly didn't see where they fell, but she knew something happened because of the shotgun's ring echoing among the trees. With gun in hand and water up to my chest, the directional signal and command were given, "BACK"! Without hesitation she turned and swam over, through and around obstacles to complete the retrieve. She got both birds on the water, but it was the 30-yard blind retrieve that made me smile.

If you saw Molly today you'd never know she was once a stray who was picked up off the streets and put in the pound. She's not AKC registered, nor does she have a famous bloodline. She will never be on ESPN jumping for distance or competing in field trials among the world's finest, but Molly is the expression of the American dream in canine form, and I'm proud to call her mine. ⬘

Jonathan Hewitt, an Elizabeth City native, is an athletic trainer for the U.S. Marine Corps in Jacksonville.

SEEING WHAT IS THERE

FOR THE LANDSCAPE PHOTOGRAPHER, THE CHALLENGE LIES IN THE ORDINARY AND FAMILIAR.

I've been seriously photographing for about 35 years. That doesn't count my early years with a Kodak Hawkeye camera and later with my first 35 mm Japanese camera that I bought with $17 of my newspaper delivery money. Much later, a friend taught me how to develop film and enlarge an image, and I've been hooked ever since.

But not as a photographer of wild animals. I have too much respect for Jack Dermid, Ken Taylor and Derrick Hamrick (to name just a few of the wildlife photographers whose superlative work has appeared in *Wildlife in North Carolina*) to want to enter the same arena. The set of knowledge and skills possessed by such photographers is intimidating. They must know where an animal subject is likely to be and what time of day is best to find it, which means they have to be familiar with the animal's biology. And their self-discipline! It's not uncommon for a wildlife photographer to spend days in a cold, wet blind waiting for the subject to show itself.

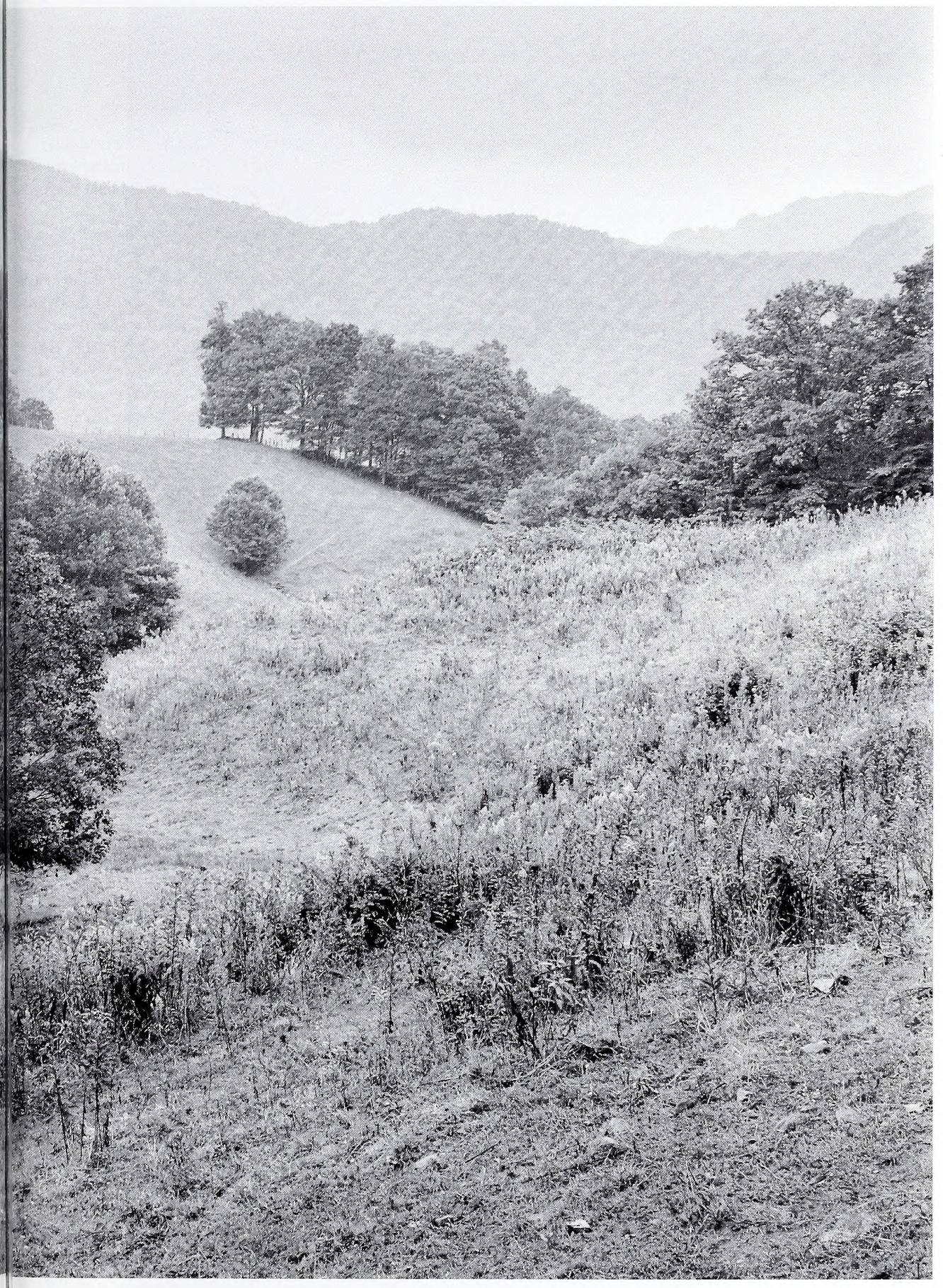
No, landscape photography is more my style. Not because it's any easier — a landscape photographer has to have discipline as well as many of the same skills and instincts as a wildlife photographer — but because it fits my way of experiencing the world.

I like to photograph while walking through a challenging landscape. As I walk, I open myself to the landscape, not thinking ahead — which is what a wildlife photographer must always do — but patiently watching and waiting for an image to present itself to me. In a way, the walk is as important and as rewarding as the photographs. If I don't make a good photograph that day, I still had the walk.

A view of the hardwood forest at Mason Farm Biological Preserve in Chapel Hill.

WRITTEN & PHOTOGRAPHED BY LAWRENCE S. EARLEY

A panoramic look at a Mitchell County cattle farm, including a stream and surrounding hillsides.



What makes a good landscape subject? For many photographers, it's something spectacular—dramatic mountain vistas, sensational seascapes with a blood-red sun sinking into the ocean. Indeed, who isn't affected by Ansel Adams' dramatic black-and-white landscapes of Yosemite Valley? Yet even more challenging to photograph than Yosemite National Park may be smaller, more intimate landscapes—what photographer Thomas Joshua Cooper describes as "simple accessible places, familiar and ordinary."

A few years ago, I assigned myself to photograph such a place, the Mason Farm Biological Preserve in Chapel Hill. Mason Farm is a 367-acre farm that Mary Elizabeth Morgan Mason gave to the University of North Carolina in 1894 with the understanding that it was to be maintained more or less as it was when the gift was made. For about a year, I'd drive to Chapel Hill every few weeks and walk the trails of the preserve for several hours or more. It offered a variety of interesting scenes: a mature bottomland forest, a shagbark hickory slope, an old field succeeding to pines, beaver ponds.

What I wanted to do was to visit this small landscape so often that I'd be forced to look more closely and see more deeply as I exhausted the obvious photographic subjects. And in time, I became so familiar with the place that I often didn't know what to shoot. To wake myself up, I'd stand still and look at a scene for 10 minutes or more, eyes open but not focusing on anything in particular, attentive, waiting, my senses attuned to my surroundings like antennae.

If I was lucky, something might emerge, something I hadn't seen before—a tree leaning in a certain way, the shape a foreground rock made against a shattered tree in the distance. Common things, generally; ordinary, everyday things. I would take a picture then, and if it was any good, it wasn't because I had been patient but because I had emptied myself of my expectations and met the landscape on its own terms. I finally saw what was there all along.

Of course, seeing what's there brings its own dilemmas. Should you eliminate those "distracting" telephone poles and wires from your landscapes? The unattractive mobile home next to the picturesque barn? The subdivision next to the pretty hardwood forest? Some photographers leave them in the picture to acknowledge the man-made alterations of our natural landscapes. They, too, are photographing what's there, they say.

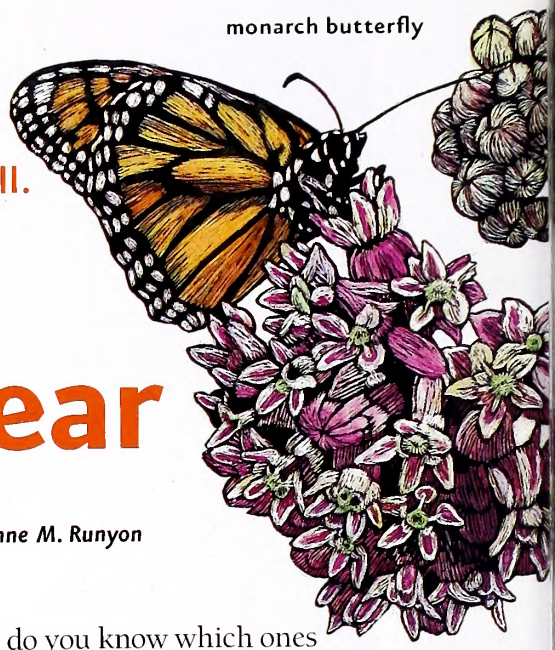
True enough, although I prefer landscapes that carry suggestions of stillness and peace, that quiet my soul, not provoke it. Landscapes that halt the rush of the human world, at least for a while, are the ones I enjoy photographing most.

Which leads to another truth about landscape photography: Often the scenes you choose to shoot say more about you than about the landscapes themselves. What you see is often yourself. ◆

Lawrence S. Earley is a former editor of WINC. *His book "Looking for Longleaf: The Fall and Rise of an American Forest" is now available in paperback.*

Below: Spring foliage at Mason Farm. Opposite page: A still harbor at sunset in the community of Atlantic and a mountain conifer stand. The *Wildlife in North Carolina* 2006 Photo Competition is open until Sept. 15. For rules and to enter, visit www.ncwildlife.org.

I HAD EMPTIED MYSELF OF MY EXPECTATIONS AND MET THE LANDSCAPE ON ITS OWN TERMS. I FINALLY SAW WHAT WAS THERE ALL ALONG.


monarch butterfly

Their blossoms are a sure sign of summer, and their fluff-packed seed pods signal the arrival of fall. Let's follow these North Carolina plants through every season.

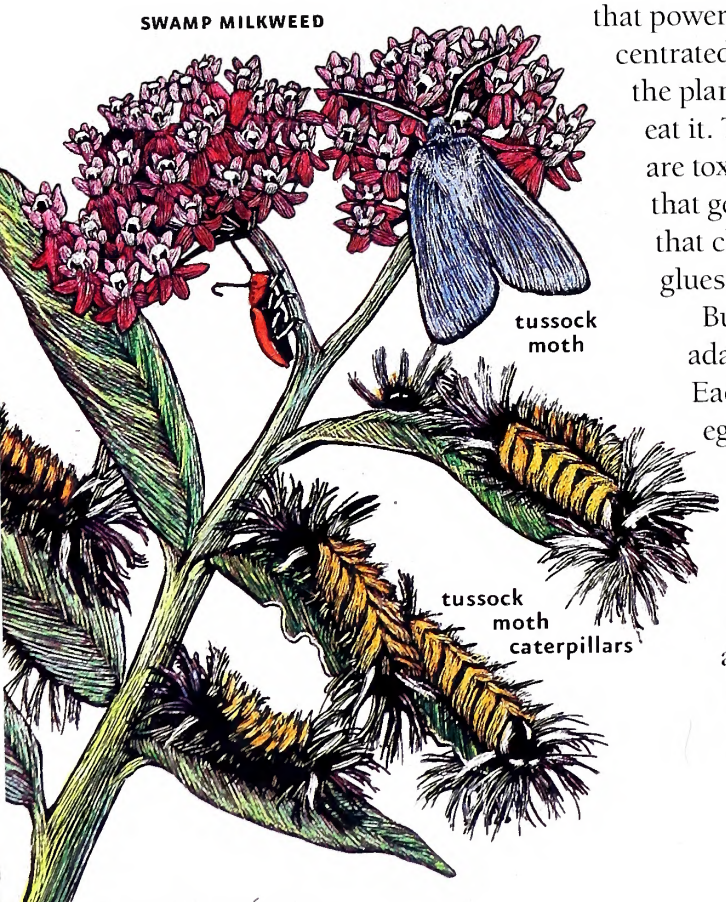
A Milkweed Year

written by Julie Dunlap / illustrated by Patricia Savage / nature activity by Anne M. Runyon

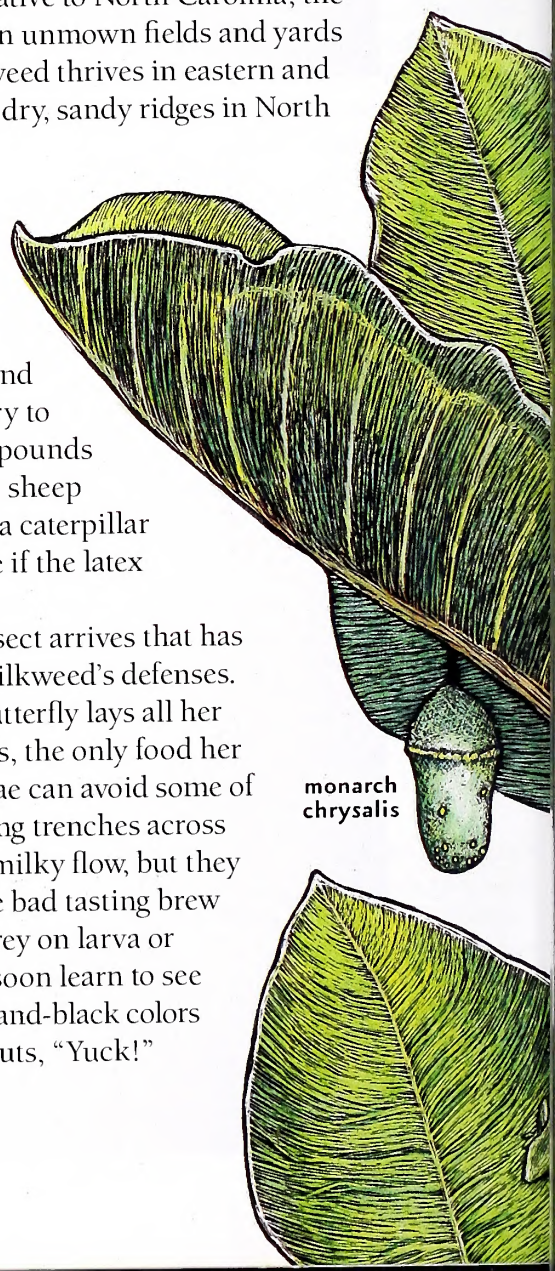
SPRINGING TO LIFE

Countless green shoots poke out of the warming spring earth, but how do you know which ones are milkweeds? Snap off one leaf. Does a sticky, white juice flow from the break? That milky latex gave the plant its familiar name. Over 200 kinds of milkweed grow around the world, with more than 100 sprouting up each spring in North America. Of 17 species native to North Carolina, the best known is common milkweed, a welcome sight along roads and in unmown fields and yards through much of the eastern and central United States. Swamp milkweed thrives in eastern and central wetlands, while the rare sandhills milkweed can be found on dry, sandy ridges in North Carolina and a few other southern states.

Scientists have named all these related plants *Asclepias*, after Asclepios, the Greek god of healing. Native Americans and early settlers used milkweed as medicine to treat everything from coughs to warts. Today, scientists know that powerful chemicals concentrated in the latex help defend the plant from animals that try to eat it. The bitter tasting compounds are toxic enough to poison a sheep that gobbles too much, and a caterpillar that chews a leaf may starve if the latex glues its mouthparts shut.



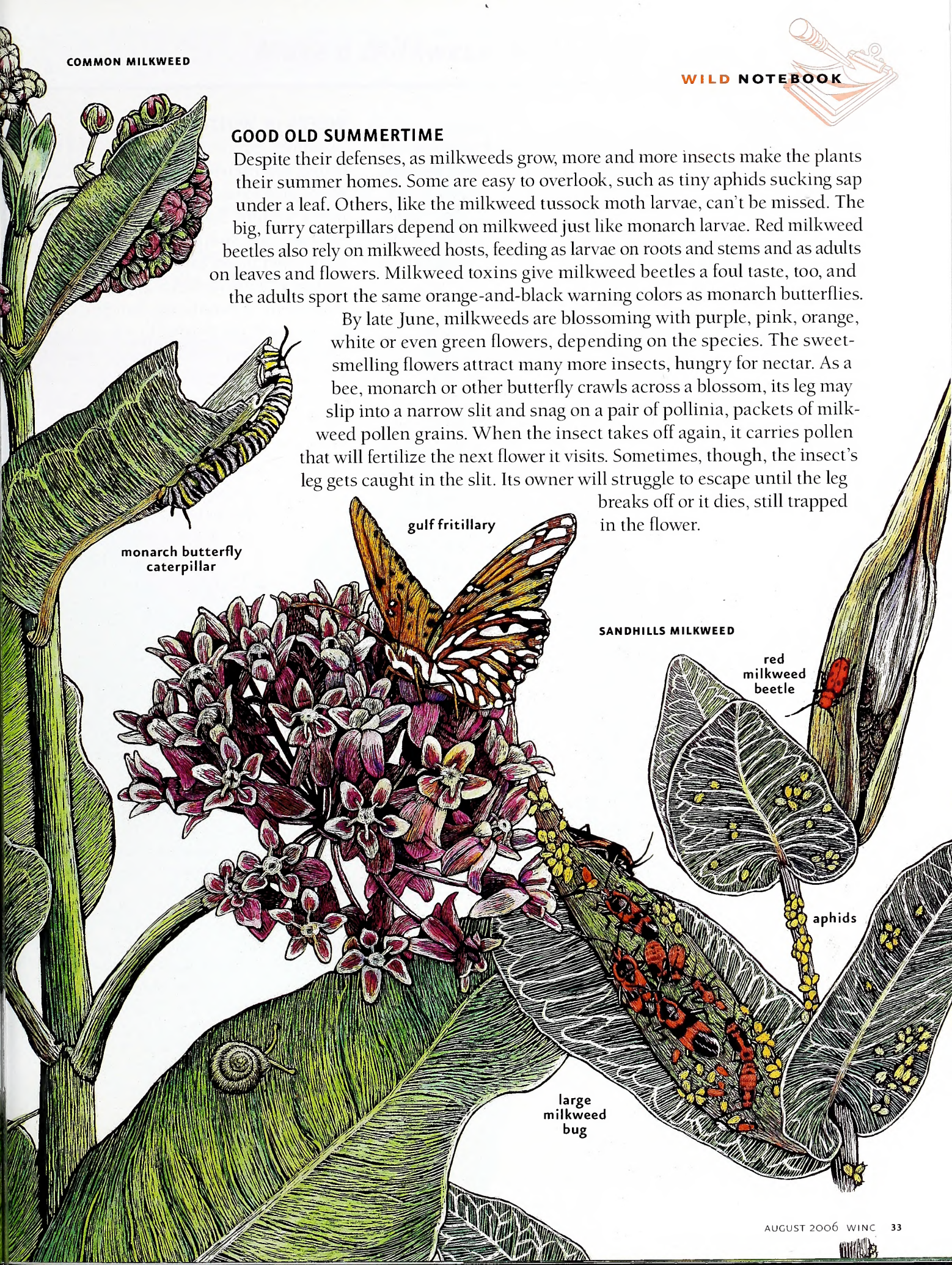
But in late spring, an insect arrives that has adapted to survive the milkweed's defenses. Each female monarch butterfly lays all her eggs on milkweed leaves, the only food her caterpillars eat. Larvae can avoid some of the latex by chomping trenches across leaves to cut off the milky flow, but they still eat enough of the bad tasting brew to sicken birds that prey on larva or adults. The predators soon learn to see the butterfly's orange-and-black colors as a warning that shouts, "Yuck!"


monarch chrysalis

GOOD OLD SUMMERTIME

Despite their defenses, as milkweeds grow, more and more insects make the plants their summer homes. Some are easy to overlook, such as tiny aphids sucking sap under a leaf. Others, like the milkweed tussock moth larvae, can't be missed. The big, furry caterpillars depend on milkweed just like monarch larvae. Red milkweed beetles also rely on milkweed hosts, feeding as larvae on roots and stems and as adults on leaves and flowers. Milkweed toxins give milkweed beetles a foul taste, too, and the adults sport the same orange-and-black warning colors as monarch butterflies.

By late June, milkweeds are blossoming with purple, pink, orange, white or even green flowers, depending on the species. The sweet-smelling flowers attract many more insects, hungry for nectar. As a bee, monarch or other butterfly crawls across a blossom, its leg may slip into a narrow slit and snag on a pair of pollinia, packets of milkweed pollen grains. When the insect takes off again, it carries pollen that will fertilize the next flower it visits. Sometimes, though, the insect's leg gets caught in the slit. Its owner will struggle to escape until the leg breaks off or it dies, still trapped in the flower.



FALL HARVEST

Thanks to pollen-hauling insects, milkweeds bear seed-packed fruits, called pods, each fall. Common milkweed pods are large and bumpy, fat on the bottom and pointy on top. Sealed inside are hundreds of flat brown seeds, each attached to silky white fibers. Often, another orange-and-black insect swarms over the pod. Milkweed bugs pierce the thick outer pod covering to feed on the seeds inside.

When the pods ripen, milkweed earns one of its other names: silkweed. The pods crack open, and the silky fibers act like parachutes, carrying milkweed seeds wherever a puff of wind will take them. Many land on pavement, in lakes and other places seeds cannot grow. But a few find a place with just the right soil and sun to sprout next spring.

WEEDS IN WINTER

By winter, milkweeds look like dead brown stalks. But even as they rattle in the chilly wind, milkweeds provide food and shelter to native wildlife. Some of the dried stems have strange, hard swellings called galls. A gall fly or other insect causes the golf-ball sized bumps when it deposits an egg inside the plant stem. When the egg hatches, the larva feeds off soft plant tissue inside the gall, protected from birds and other predators by a hard outer layer. Sometimes, though, a chickadee lands on the stem and tears open the gall to snatch a much-needed winter meal.

Below ground, the milkweed plant is still alive. Its long taproot stores nutrients from the past growing season, ready to send up shoots again when the weather warms and another milkweed year begins.

COMMON MILKWEED SEEDPOD

Get Outside

Become a milkweed monitor. Find some milkweed near your home and visit it often. Make sketches and take notes on how it changes month by month. How many kinds of insects can you find? Which ones live on the plant in different seasons? What can you notice about the different types of damage you see on the leaves? In fall, collect some of the seeds to start your own milkweed garden. Plant them in a sunny spot where you can watch monarchs and other visitors when it blooms next summer.

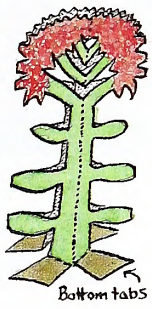
Read and Find Out

- "The Butterfly Book: A Kid's Guide to Attracting, Raising and Keeping Butterflies" by K. R. Hamilton, Avalon Travel, 1997.
- "A Field Guide to Wildflowers" by Margaret McKenny, Houghton Mifflin, 1998.
- "Monarch" by Gail Gibbons, Holiday House, 1991.
- "Monarchs" by Kathryn Lasky, Harcourt Brace, 1993.
- "Once upon a Milkweed" by Anurag Agrawal and Stephen Malcolm, *Natural History*, September 2002.

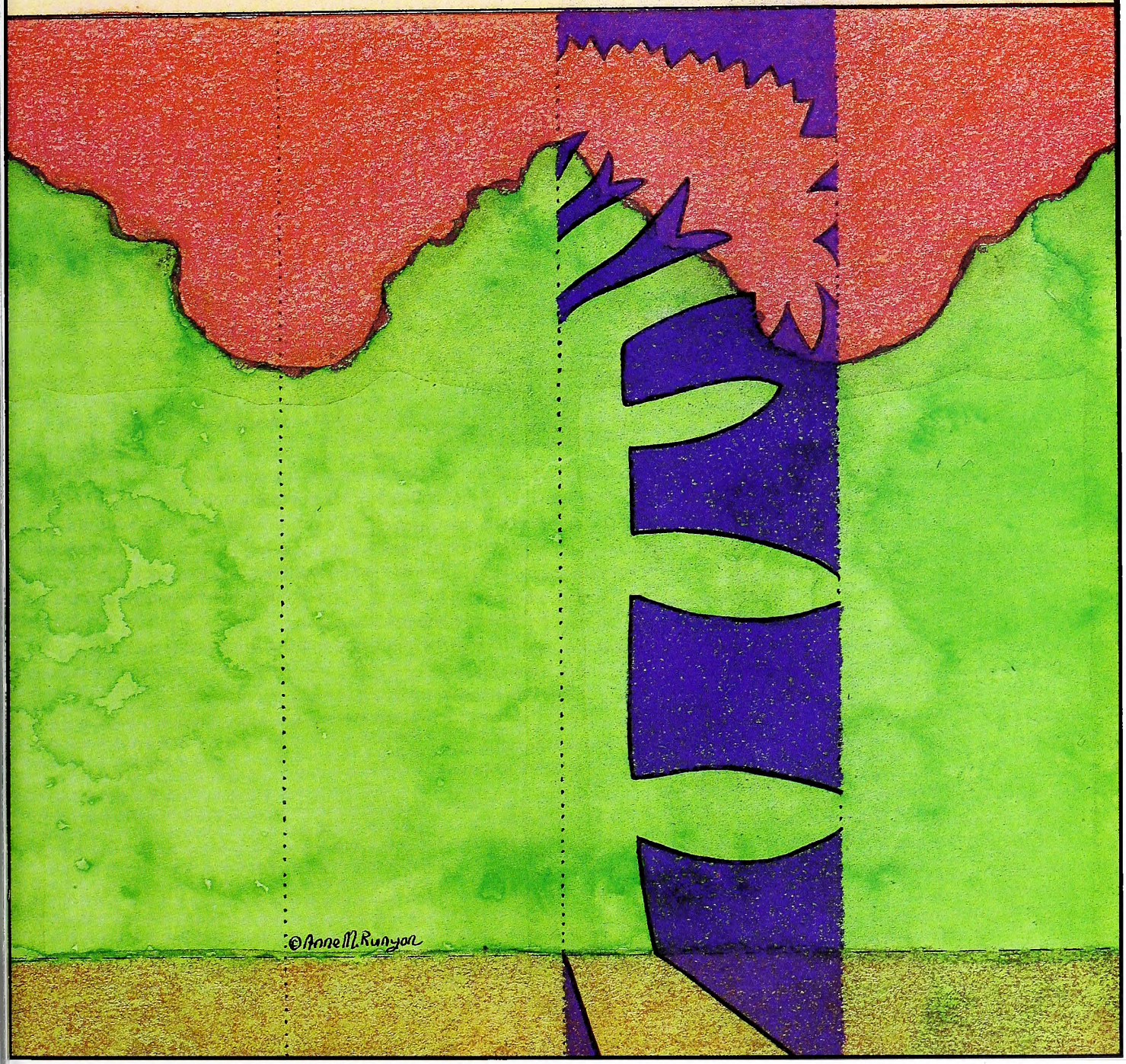
Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Milkweed Sculpture!

1) Cut out box along thick black lines.
2) Fold box in half, folding down center ... line.
3) Fold down both outer sections along ... lines.
4) Section edges will meet in center. Tape edges together along seam.



5) Fold in half again, purple areas on top.
6) Cut away purple, cutting through all four layers.
7) Unfold, slide finger inside and crease taped edge out to make a 3-D milkweed flower.
8) To make flower stand: fold brown tabs up, and tape to flat surface.



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Commercial Fishing Harvest Lowest on Record

Continuing a trend that began in 1997, North Carolina's commercial fishing harvest continues to drop, while recreational fishing remains stable, according to harvest data released by the N.C. Division of Marine Fisheries. The 2005 commercial harvest of finfish and shellfish totaled 79 million pounds, valued at $64.9 million, North Carolina's smallest harvest on record. Data suggests other Southeastern states are experiencing similar declines.

MELISSA McGAW

Landings fluctuate for a variety of reasons—weather, fuel prices, market demand, availability of seafood, low-cost imports, the number of people fishing and harvest restrictions. Each of these factors came into play during the 2005 fishing year.

One reason for the depressed 2005 landings was the small menhaden catch; only 13.3 million pounds of the oily industrial fish were landed at Tar Heel docks. Landings in this fishery can fluctuate widely, from the low of 13.3 million pounds, to over 300 million pounds, depending on the amount of effort the commercial industry expends. That effort was minimal in 2005, with only 15 fishing trips reported using purse seines, the principal gear for taking menhaden.

Blue crabs and shrimp, two other commercial mainstays, experienced decreased landings. The blue crab harvest was 25.6 million pounds, compared to the previous five-year average of 36 million pounds. Shrimp landings were 2.3 million pounds, down from the previous five-year average of 7.3 million pounds. Trip data show fewer crab pot and shrimp trawl fishing trips were made in 2005. The higher cost of fuel, lower market value of shrimp due to imports and the scarcity of crabs and shrimp all contributed to the landings decline.

In 2005, the International Trade Commission ruled that six countries—Brazil, China, Ecuador, India, Thailand and Vietnam—had injured U.S. fishermen by dumping shrimp on the U.S. market and imposed additional duties on shrimp from those nations. Dumping occurs when a product is sold at a price that is less than it cost to produce. Those six nations annually export approximately 1 billion pounds of shrimp to the U.S.

The state's oyster harvest continues to be a highlight to the commercial sector. In 2005, watermen caught 71,479 bushels, an increase over the 69,501 bushels harvested in 2004, and well over the previous five-year average of 50,431 bushels. This modest gain in oyster harvest is most likely attributed to favorable growing conditions, including higher levels of rainfall than in previous years.

Compared to the previous five-year average, other increased commercial landings in 2005 were gag grouper, grunts, king mackerel, porgies, beeliners (vermillion snappers), red drum, swordfish and bigeye tuna.

On the recreational front, the number of estimated anglers increased to 2.4 million in 2005, with most growth coming from out-of-state fishermen. Anglers landed 12.7 million fish and released another 16 million. Yellowfin tuna topped the charts for pounds of fish landed (5.5 million pounds), followed by dolphin (5.1 million), striped bass (2.2 million), king mackerel (1.3 million) and bluefish (1.1 million). There were minimal declines in the number of fishing trips and harvest compared to the previous year, which could possibly be attributed to fuel costs.

Commercial Effort Summary

Year	Active Fishermen	Pounds Harvested	Fishing Trips
2000	5,031	154,229,116	259,746
2001	5,076	137,163,960	246,914
2002	4,694	160,171,058	213,513
2003	4,352	139,425,054	197,314
2004	4,255	134,102,127	185,627
2005	3,890	79,162,659	155,112

Recreational Effort Summary

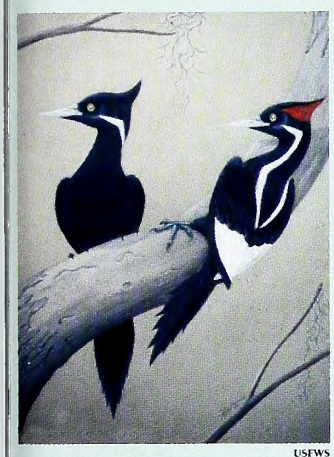
Year	Active Anglers	Pounds Harvested	Fishing Trips
2000	1,921,780	22,699,280	6,460,011
2001	2,006,661	24,145,835	6,649,546
2002	1,765,205	17,879,149	5,586,122
2003	2,102,925	22,009,304	6,733,464
2004	2,055,415	24,905,130	7,024,464
2005	2,360,712	22,077,462	6,653,357

Searchers Fail to Find Ivorybills

The 2005–2006 search for the ivory-billed woodpecker in the Big Woods of Arkansas concluded in April without the definitive visual documentation of the bird. The search, led by the Cornell Lab of Ornithology, with support from Audubon Arkansas, stretched from November through April when ivorybill activity would be highest and a lack of leaf-cover permitted clear views through the dense forest.

The search included 22 full-time searchers and state-of-the-art acoustic and video monitoring technology. To supplement the full-time effort, volunteer groups of 14 spent two weeks at a time helping to search the 550,000-acre area focused on the Cache and White River National Wildlife Refuges.

"The search teams were very skilled, not only technically but in the execution of the search," said John Fitzpatrick, director of the Cornell Lab of Ornithology. "Even though we didn't get additional definitive evidence of the ivorybill in Arkansas, we're not discouraged. The vastness of the forest combined with the highly mobile nature of the bird warrant additional searching."



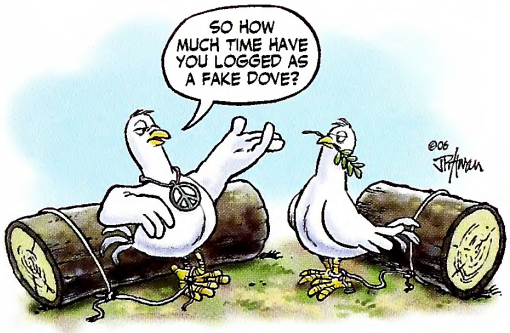
USFWS

Searches and assessments of habitat conditions at Congaree National Park in South Carolina and Georgia, principally Okefenokee National Wildlife Refuge, are now transitioning from field work to data entry and analysis. Elsewhere, efforts in Texas, Louisiana and Alabama are getting under way. All of these efforts, like the search in Arkansas, are being overseen by the U.S. Fish and Wildlife Service.

ON PATROL

Near the end of a long, busy opening day of dove season, Sgt. Cameron Ingram, Officer Brent Hodges and Officer Bray McAteer decided to check one last hunt before heading in. At the back of a farm in southern Guilford County, they found a group of hunters shooting doves.

Several citations were issued, including some for hunting with the aid of live decoys. The hunters had tied white pigeons to logs throughout the field and had placed their blinds around the decoys.



ILLUSTRATED BY JACKIE PITTMAN

Largemouth Bass Makes Statewide Mercury List

Largemouth bass and wild-caught catfish, two popular game fish in North Carolina's freshwaters, have been added to the N.C. Division of Public Health's (NCDPH) list of fish in the state with high levels of mercury. As a result of these listings, the agency recommends that women of childbearing age (age 15–44), pregnant and nursing women and children under age 15 refrain from eating these fish. All other adults should eat only one serving per week.

Largemouth bass, originally listed as high in mercury in only a portion of the state, is the first freshwater fish to make the list statewide. Wild-caught catfish, along with bowfin, chain pickerel and warmouth, are considered high in mercury when caught south and east of Interstate 85.

In addition to these fish, more than 16 saltwater fish species are listed as having high mercury levels. Among them are albacore (canned white tuna), South Atlantic grouper, king mackerel, Spanish mackerel and shark.

Consuming fish that have high levels of mercury has been linked to abnormalities in brain development of unborn children and young children. According to the NCDPH, prenatal exposure to mercury can affect the way children think, learn, and problem-solve later in life. Effects can also occur in adults at much higher doses. In adults, the earliest signs of mercury poisoning are numbness of lips, fingers or toes, fatigue and blurred vision.

NCWRC

The largemouth bass is one of the most popular game fish in the Southeast, and catfish have their share of avid anglers as well. This advisory, however, shouldn't keep people from eating fish. "While largemouth bass and wild-caught catfish pose some health risks if consumed, there are still plenty of fish out there that are good to eat, and more importantly, good for you," said Bob Curry, chief of the N.C. Wildlife Resources Commission's Division of Inland Fisheries, which manages freshwater fisheries in North Carolina.

Freshwater fish that are considered low in mercury and therefore are safe to eat are bluegill sunfish, trout and farm-raised catfish, crayfish and tilapia. Saltwater species that are considered safe to eat include salmon, flounder, canned light tuna, pompano and a variety of shellfish, such as shrimp, scallops and oysters.

According to Luanne Williams, a toxicologist with the N.C. Division of Public Health, studies show that eating fish low in mercury is good for the heart as well as for the developing eyes and brain. Therefore, the NCDPH recommends that women of childbearing age, pregnant and nursing women and children under age 15 eat two meals per week of fish low in mercury, and everyone else eat four meals per week.

For a complete list of what freshwater and saltwater fish people should eat or avoid, visit epi.state.nc.us/epi/fish/safefish.html.

IN SEASON

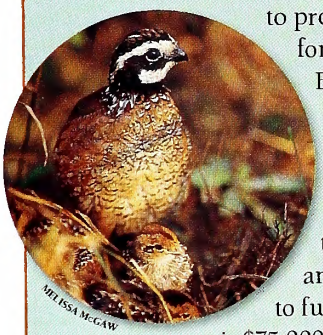
This month, this season is open in North Carolina:

Crow: Wednesday, Friday and Saturday of each week through Feb. 28, plus Labor Day, Thanksgiving and Christmas.

Check the *2006–2007 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Quail Unlimited Provides NBCI Funding

Quail Unlimited will partner with the Southeastern Association of Fish and Wildlife Agencies (SEAFWA) to provide funding for the Northern Bobwhite Conservation Initiative (NBCI) Coordinator position for the next three years. The amount required to fund this position is $75,000 per year for three years and the funding will begin in 2007.


MELISSA McGAW

The NBCI is a national recovery plan for bobwhite quail developed in 2002 under the guidance of Ralph Dimmick, a retired professor from the University of Tennessee, along with several other wildlife biologist co-leaders. The main goal of the habitat-based plan is to restore Northern bobwhite populations on their range to levels that existed in 1980. The plan was completed by the Southeast Quail Study Group which was formed under the auspices of SEAFWA. That group consists of biologists from state, federal and private organizations, including biologists from Quail Unlimited.

Don McKenzie of the Wildlife Management Institute has been serving as NBCI Coordinator for the past three years under a contract with SEAFWA. The funding by Quail Unlimited will allow SEAFWA to renew its contract with the institute and to retain him as the NBCI Coordinator.

Forbush Teams Hunter Safety Champs

Yadkin County-based teams Forbush Red and Forbush Elementary won the senior and junior team titles, respectively, at the recent 28th annual Youth Hunter Safety Tournament. Several hundred students from 52 teams competed in rifle, muzzleloader, shotgun and archery contests in the state championship at Millstone 4-H Camp near Ellerbe. They also squared off in orienteering skills with a compass on a field course and tested outdoors and safety knowledge through a written exam.

NCWRC

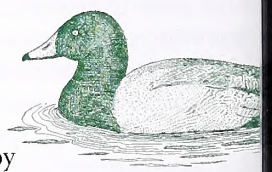
"All competitors are graduates of the hunter safety education program," said Capt. Chris Huebner of the N.C. Wildlife Resources Commission, which sponsors the championship. "The program teaches proper firearms handling, hunting ethics and how to be safe and responsible sportsmen.

"The district tournaments and state tournament are a competitive element of the hunter safety education program for youth that promotes and helps develop those skills. The tournaments are becoming increasingly popular, but the gist is tomorrow's outdoors men and women are practicing safe conduct with firearms and archery, today."

Kayla Kite of Forbush Red won the overall senior individual title with 774 points to the 770 posted by Derek Lambert of South Stanly. Alysha Wilkins from the Forbush Blue squad was third with 769.

Nicholas Doub of Forbush Elementary earned the junior individual title with 763 points, while Austin Bryant of Northeast Academy was second with 745. Hunter Nelson, Bryant's teammate, placed third with 734 points.

CALENDAR OF EVENTS



Friday–Sunday, Aug. 4–6

See the latest in boats, RVs and hunting and fishing gear at the Outdoor & Wildlife Expo at the Riverfront Convention Center in New Bern. Activities for children include bow shooting and casting for bass. Contact (252) 638-8101.

Saturday, Aug. 5

Learn the basics of fly-fishing in the Becoming an Outdoors Woman program at Pisgah Education Center in Pisgah Forest near Brevard. Topics include equipment, knots, fly-tying, casting and aquatic entomology. Limited to 20 participants age 18 and older. Contact BB Gillen at (919) 707-0172.

Monday, Aug. 7

Discover the waterfowl decoy heritage of Currituck County and create your own decoy in a carving class at the Outer Banks Center for Wildlife in Corolla. Contact Mark Buckler at (252) 453-0221.

Saturday–Sunday, Aug. 12–13

Check out the latest in guns, knives and other outdoor gear at the Dixie Gun & Knife Classic at the Jim Graham Building on the N.C. State Fairgrounds in Raleigh. Visit dixiegunandknifeshow.com for more information.

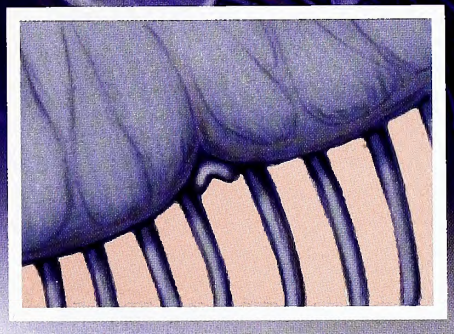
Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

How Do Jellyfish Find Their Way With No Brain?

written by Clyde Sorenson
illustrated by Alison Schroeer

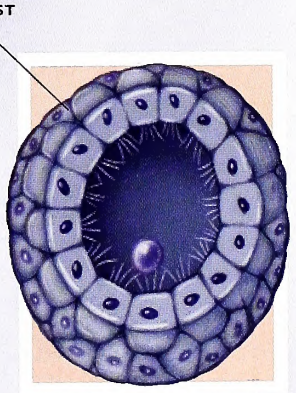
JELLYFISH ARE EXTREMELY PRIMITIVE animals with the simplest of nervous systems. But they do have several kinds of sense organs which help them find the essentials of life. Jellies are eight-fold radially symmetrical, so their sense organs ring their bodies.

Jellyfish capture prey with nematocysts, special cells that contain tiny, venomous darts. Cells alongside the nematocysts can detect the scent of prey and trigger the stinging cells. These cells can also detect prey some distance away—the animal swims towards the side receiving the scent and away from the side that doesn't.



Most jellyfish have groups of light-sensitive cells called ocelli along the edge of the bell. Ocelli don't form images, but do detect light and shadow and day and night. Depending on what the animal needs, it moves toward or away from its lighted side.

Jellyfish need to know up from down, and tiny organs called statocysts tell them. A statocyst is a hollow ball of sensory cells with a tiny particle of mineral, called a statolith, trapped inside. Gravity constantly pulls the statolith down, which stimulates the sensory cells it contacts, informing the jelly of its orientation.



Camp Coffee

written by Jim Dean

The hardy mountain men who first traveled into the American West to trap beavers carried only a few durable provisions, basically living off wild game. It was no place for a vegetarian. In 1805 and '06, the Lewis and Clark journals note that the explorers ate an average of nine pounds of fresh meat each day, mostly deer, elk, antelope and buffalo killed by hunting parties. By 1825, Osborne Russell (who later became the first governor of Oregon) had joined the swarms headed west, and he reported that the seemingly vast country was already getting crowded. Numerous trading posts supplied trappers with gunpowder and other necessities, including food items such as dried beans, flour, cured slabs of bacon and coffee.

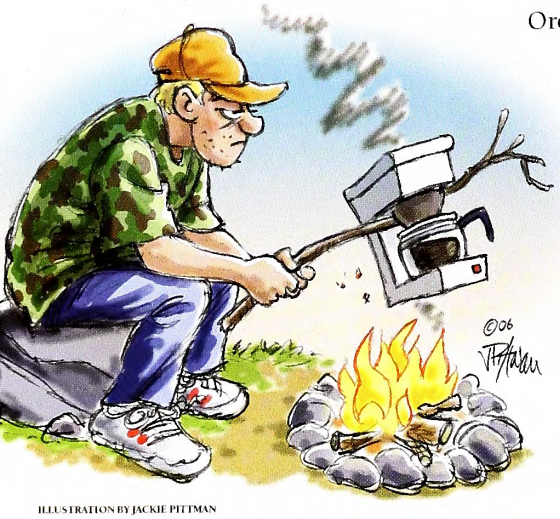


ILLUSTRATION BY JACKIE PITTMAN

Today, those are still the basic staples for many campers who fancy themselves as strong, hardy outdoorsmen—no dehydrated morels with veal medallions or stroganoff for this bunch. Any traditional camper worth his or her moldy canvas pup tent would rather eat a worm than be caught with foodstuffs that might be considered effete.

"Any coffee lover knows that the early morning effects of caffeine are like a jolt from jumper cables."

This, of course, is a romantic conceit guaranteed to inflict maximum abuse upon oneself. And while it is clearly unnecessary nowadays, it has a certain appeal. There is something irresistible about sitting around a campfire burning your lips on a tin cup of black coffee scalded in a sooty pot over an open flame while your staples are cooking. Never mind that the bacon is scorching, the pintos are boiling over and the bannock dough that you twisted around a stick and propped next to the blaze would crack a crocodile's teeth. This is no-nonsense camp food, and only a pitiful wuss would prepare broccoli, shitake, garlic and pine nut pasta washed down with pinot noir and topped off with dark chocolate and toasted marshmallows. Forsooth!

It took years, and some unnecessary dental work, for me to re-evaluate my loyalty to this compelling image of mountain man chow. But I finally abandoned bannock and slab bacon for store-bought equivalents, and if I eat beans at all, I eat 'em from a can—and when no one is sharing my tent. Coffee, however, is another matter. Any coffee lover knows that the early morning effects of caffeine are like a jolt from jumper cables. Even if we hated the taste, we'd take a pot full through an IV.

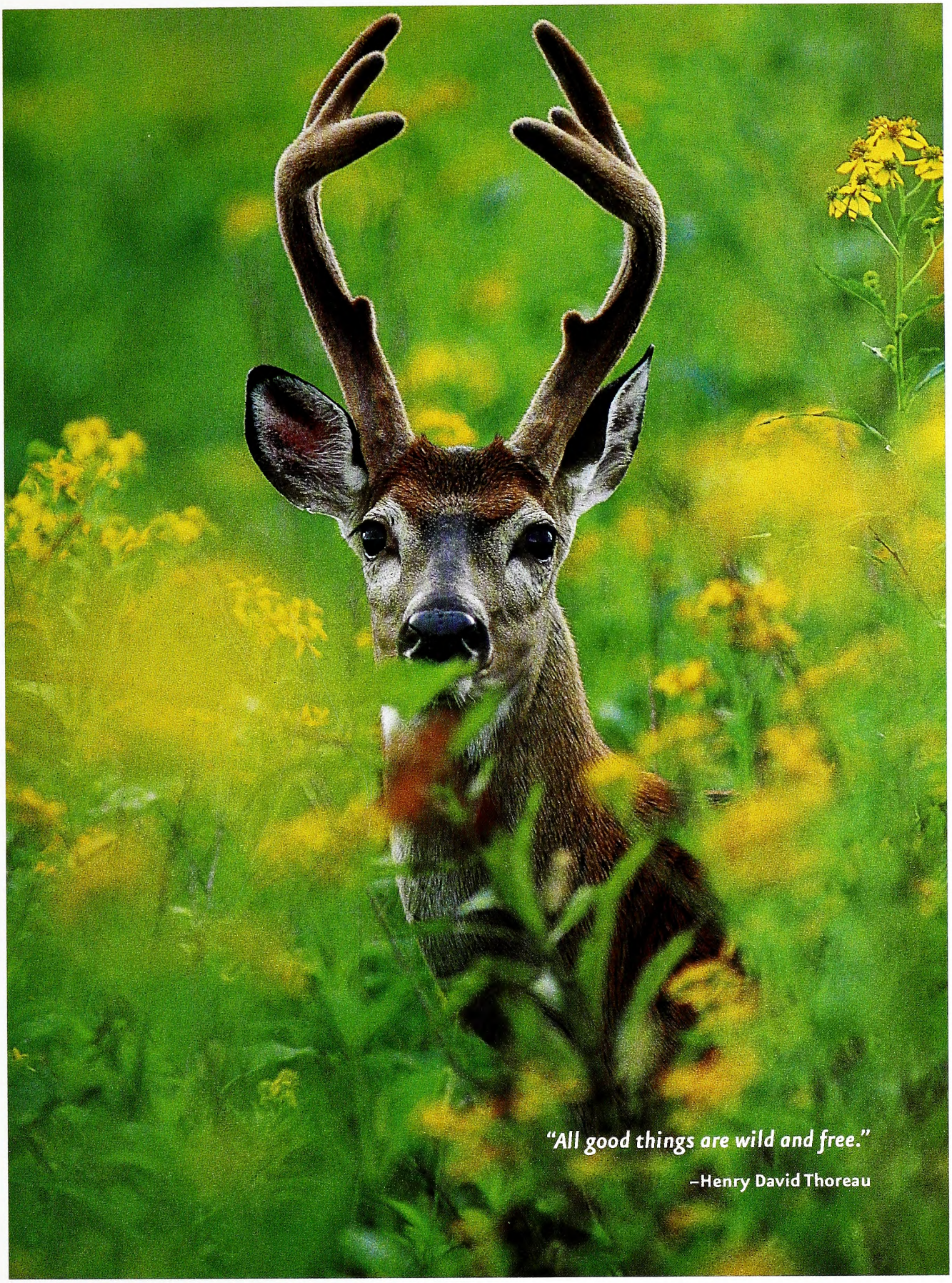
For a while, I still endeavored to prepare my morning elixir in time-honored fashion. Since mountain men had neither drip pots nor percolators, that dictated black coffee boiled in an open pot. With no filtering system, the resulting brew was always full of grounds (which mountain men saved and reused over and over). Alas, my attempts required as much chewing as drinking. Then, I happened to read about a method early settlers had employed. Eggshells added to the hot mix would supposedly coagulate the grounds, causing them to sink.

My first attempt yielded a pot of black scrambled eggs, so I tried again using eggshells that had been carefully cleaned and dried. The result was coffee swirling with so much shell that it looked as though someone had crushed a fluorescent bulb into it. Perhaps, I thought, I have misunderstood the instructions.

I was still boiling coffee when I camped along the Watauga River one Opening Day. I discovered that I had forgotten to bring an open pot, so I washed out some empty beer cans and let the boiled brew sit until most of the grounds had sunk. The coffee was still so thick I had to sip the top half of several cans to get my fix. After that, I threw in the towel and bought a small stainless coffee pot designed to percolate the brew. That well-dinged and blackened unit has now been part of my camping gear for 40 years.

Recently, coffee aficionados have denigrated perked coffee, claiming that the boiled grounds result in bitter coffee. If that's true, my sense of taste is far too primitive to detect it. But if you insist on dripped coffee, you might look for an aluminum pot like the one my friend Dick Hawes has. The lidded top portion holds the grounds and when it's filled with hot water, it drips through tiny holes into a larger pot (the top pot nestles into the lower pot). Perhaps someone makes a modern version, but neither Dick nor I have seen any in catalogs (he found a second one in an antique store).

As for me, I've intentionally gone soft. Not only am I perking my coffee, I recently bought a portable grinder that yields coarse-ground pepper for my campfire pasta. My rationale is that mountain men would have carried pepper grinders and electric espresso pots over the Oregon Trail in their Winnebagos if such things had been available.



BILL LEA

Whitetail buck in velvet

OUTDOOR MOMENT

IN THE SEPTEMBER ISSUE

MELISSA MCGAW

LONGLEAF RESTORATION

A Bladen County landowner attempts to bring back longleaf pines and the wildlife species that depend on them.

SMALLMOUTH BASICS

Whether you're a novice angler or bonkers over bronzebacks, this primer will show you the ins and outs of smallmouth bass fishing.

THE STING'S THE THING

These eight "touch-me-not" caterpillars appear colorful or even cuddly, but their sharp spines can cause painful sensations.

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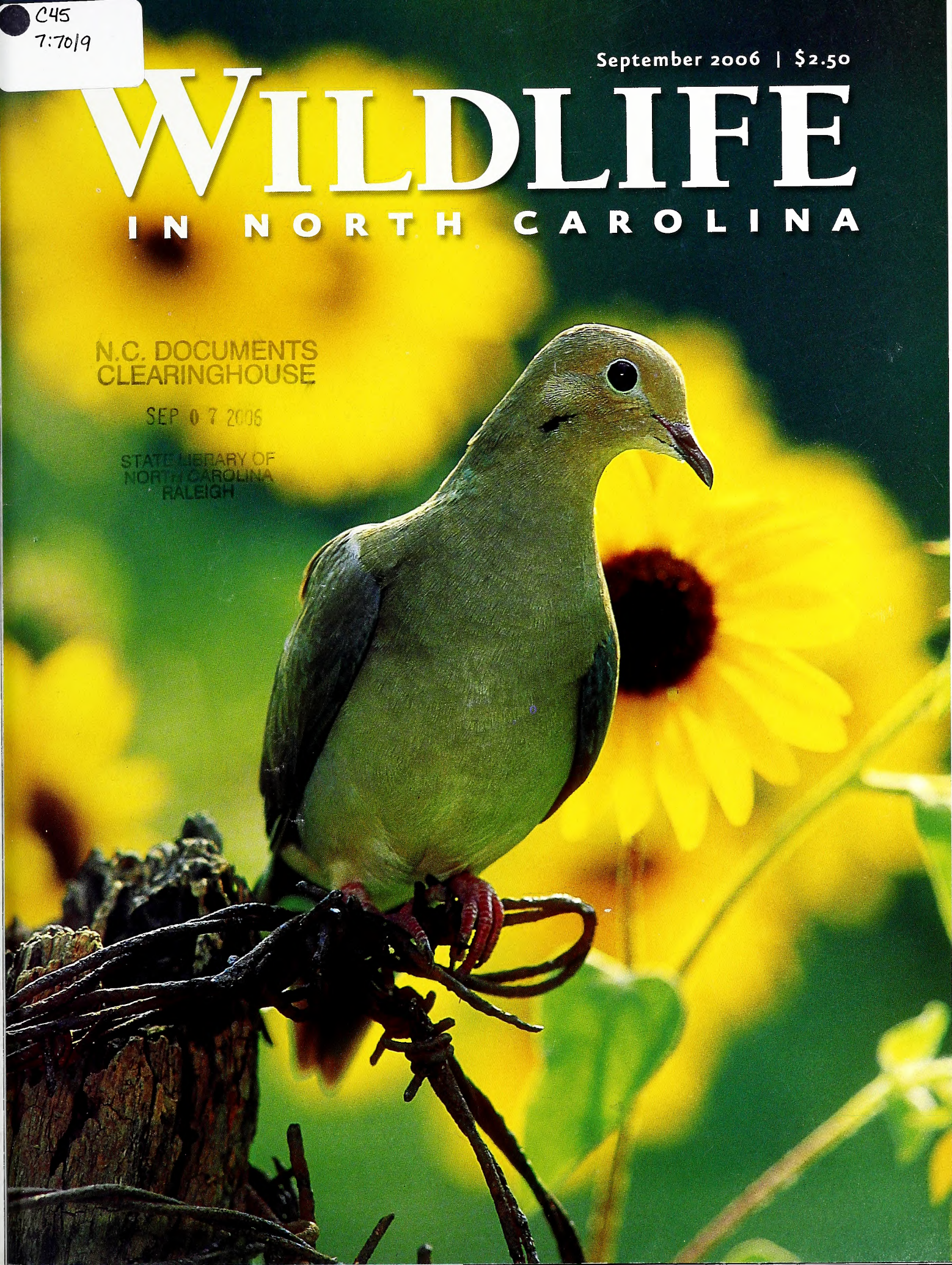
WILDLIFE IN NORTH CAROLINA



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Less than 2 inches long, the pine woods treefrog inhabits longleaf pine stands. Its tiny size and mottled coloring enable it to hide in places such as this longleaf cone. **PHOTOGRAPH BY TODD PUSSER.**

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Cover: September belongs to mourning doves. North Carolina is rich with habitat favorable for the game bird. PHOTOGRAPH BY MASLOWSKI PRODUCTIONS.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

For some people, Labor Day weekend means the end of summer. For others, it signals the start of football season. But for those who love to sweat in farm fields while wearing camouflage clothing, the first Saturday of September always means the opening of mourning dove season. It can be a day of simple pleasures—a gun, some time outside and perhaps some birds in the bag. Or it may represent a social occasion in which dozens of wing shooters may take to the field in unison and celebrate their hunt afterward with dove breasts on the grill and toasts to good fortune and comradeship.

F. EUGENE HESTER

For the diehard hunter, Labor Day weekend is the opening volley of a series of shots that will echo until the end of upland game bird season in February (and probably resume for a month during turkey season in April). Sure, you can hunt crows and varmints in summer during the traditional off-season, but any dove hunter can tell you that there is nothing like hunting doves. The common-as-dirt bird that is a goofy bobblehead while planted on terra firma becomes an elusive gray ghost aloft, darting and dashing like a bumblebee.

Wildlife Commission biologists spent part of the summer trapping and banding doves in preparation for this season. A bit of corn or millet inside a wire cage did the trick, and hundreds of doves flew away only after having their wing feathers examined and being fitted with a tiny anklet. As common as the mourning dove is, wildlife scientists know precious little about its travels. Mike Marsh explains in "Birds in the Hand" (page 16) how this information will help improve management of the species and, therefore, those September hunts that are so special.

Just because an animal is plentiful doesn't mean it should not be studied and protected. Gathering data that fosters understanding about how mourning doves live their lives will aid immeasurably in making sure that doves don't end up like turkeys once did or quail have now. And it will help ensure that Labor Day weekend remains fun rather than frustrating.

Greg Jenkins

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SEPTEMBER 2006 VOLUME 70, NUMBER 9

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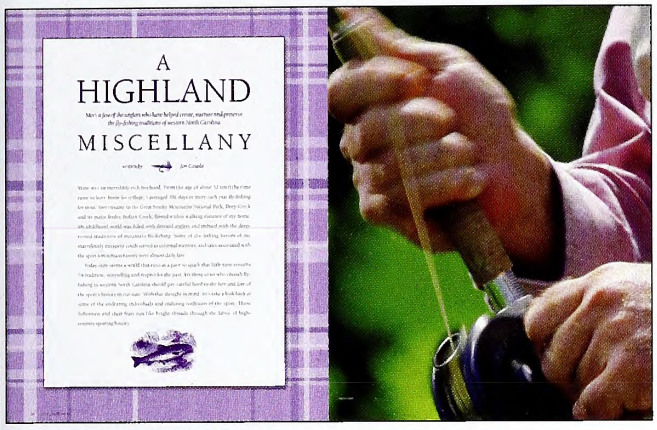

Old-Time Respect

Thanks to you and Jim Casada for reminding us of our trout fishing and fly-tying heritage in the July edition ("A Highland Miscellany"). I knew Cap Wiese when he and I were members of the Northwest chapter of Trout Unlimited in the late 1970s. Cap used to bring some of his Sheep Flies to raffle off. The last time I saw Cap I told him of fishing Dugger Creek in Wilkes County not far from Patterson School, where he had been headmaster. Cap was in his late 70s, and I was in my late 20s. Cap said he stocked Dugger with browns himself in the 1930s. Cap died two weeks after that conversation while on a fishing trip to Cherokee.

I learned of Fred and Allene Hall through the writing of Jim Casada, and I tie and fish the Adams Variant more than any fly in my vest. Jim should add his name to the list, even though he lives in Rock Hill, S.C.

Michael Ramsey
Startown

Having been born and raised in Bryson City, I read with great interest Jim Casada's "A Highland Miscellany." Mark Cathey and my father, William Paul "Petey" Angel, bear hunted and fished together on Deep Creek before it became part of the Great Smoky Mountains National Park in 1945. As a boy, I delighted to hear my father relate Mark's antics while attempting to imitate his unusual brogue.

Billy Rolen and I went to school together and fished Deep Creek, Indian Creek and other park streams as well as the Nantahala River hundreds of times. On occasion we would walk the 6 miles, including 14 deep crossings and the Deep Ford, to the old ranger station known as the Bryson Place, fish all day and then walk out.

The largest trout I ever caught in Deep Creek was a 19-inch rainbow which succumbed to a Royal Wulff in a noted deep hole just below the Bryson Place in 1955. I never remember Billy Rolen catching any fish over 18 inches. Large trout on Deep Creek were few and far between. I sure would like to know where Frank Young caught those 50 brown trout over 18 inches in one season. That feat would surely have created a stir among the fishermen I grew up with. Thanks for the memories, Jim.

Dick Angel
Thomasville

I really enjoyed Jim Casada's article "A Highland Miscellany" in the July edition. However, I must take exception with his crediting Cap Wiese with the Sheep Fly. That credit should deservedly go to Newland Saunders of Lenoir. Newland first tied that fly approximately five years before giving it to Cap, who used the fly and popularized the pattern all over the country. Newland and Cap fished together up until Cap's death.

In your April 1991 issue, Vic Venters wrote in "Southern Appalachian Nymph Patterns" of the Sheep Fly: "Nondescript but deadly, the Sheep Fly is another homegrown Tar Heel nymph. Invented by Newland Saunders and popularized by Cap Wiese — two old-time North Carolina trout fishermen."

Newland is my friend. We have spent many a day fly-fishing and exchanging tales; his are much better and far more entertaining than mine. Newland still fishes as often as his lovely wife Kathy lets him out of the house. He still ties and fishes the Sheep Fly on a regular basis. Newland is a wealth of information regarding N.C. trout fishing. Perhaps Mr. Casada will drive up to Lenoir for a proper interview with a legendary N.C. trout fisherman, and maybe, just maybe, Newland will show him how to tie a Sheep Fly.

J. L. Pryce
Asheboro

Jim Casada: Thanks for both your kind comments and your attribution of the Sheep Fly to its true originator. My roots are in the far southwestern part of the state, and as a result I know less about the home waters of Newland Saunders and the late Cap Wiese. In fact, of all the folks I mention, Wiese is the only one I never met. I certainly meant no offense to Saunders. It is just that I've always heard the fly mentioned in connection with Cap Wiese's name and assumed he was the man who developed it. As for interviewing Newland Saunders, I have a better idea. I'd love to spend a day or part of a day astream with him. Thanks for the correction and the well-deserved homage to Mr. Saunders.

A Popping Good Time

I say "amen" to Gerald Almy's observation that when you want to go out and simply have a fun day on the water, it's hard to top panfish. I'm in my 82nd year and I've had many, many fun days on the water after panfish, most often after bream (bluegills).

However, I can't imagine a list of favorite lures that would not include small, topwater popping bugs. When bream are on the beds, nothing can be more fun than throwing them a white or yellow (though color is not all-important) popping bug with a light fly rod. The action is fast, furious and sustained. Granted, not all panfish are fond of topwater poppers, but many of them are.

One day about 70 years ago, after my uncle first put me on a bream bed with a fly rod and a popping bug, and after catching and releasing about 30 nice bream, he said to me, "Son, I have ruined you today! You'll be after bream the rest of your life!" I'm so thankful that he was exactly right.

John W. McAlister Jr.
Charlotte

write us

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MELISSA McGAW

My Longleaf

The author attempts to create a small but virtually self-sustaining stand of longleaf pine that will support many species of longleaf-dependent birds and terrestrial animals.

While I was checking to see if the yellow-billed cuckoo was still incubating the eggs in her nest, Biscuit, our aging golden retriever, flushed a whip-poor-will. The female bird successfully lured Biscuit away from her nest with a good rendition of her broken wing act while I located her eggs. Like that of many ground-nesting birds, the "nest" was simply a depression in the sand, with the eggs' subtle markings providing good camouflage. A decade or so back, chuck-will's-widows nested throughout our property, but over time they were replaced by an expanding population of the more northern whips. Though there was no doubt that whip-poor-wills had been nesting here for a number of years, this was the first actual nest I had encountered.

Our morning outing had a purpose. I was attempting to inventory the breeding birds and other creatures living on an 11-acre portion of our land that three decades previously had been planted in longleaf pines. The trees were now obtaining considerable size, and it was my hope to restore, as much as possible, these few acres to a more natural-appearing longleaf stand. Because of fire suppression, logging and other land use patterns, longleaf forests are much less common in southeastern North Carolina than they were in the past. To me this little tract had the potential to serve as a visual indication of what the landscape looked like in former times.

Then, a year or so back, my wife and I became aware of a cost-share program sponsored by the U.S. Fish and Wildlife Service. It, too, is concerned about the fragmentation and loss of this once-vast longleaf ecosystem. Through a wildlife cooperative extension agreement, the service will fund fire-line development and maintenance, controlled burning and the purchase of chemicals to kill woody vegetation. Each grant is customized for specific sites and landowners. As part of our financial match I was to conduct breeding bird studies both before and after removal of the tangle of woody undergrowth. In addition, we agreed to continue to maintain the habitat in an open, more natural state through controlled burns for at least a 10-year period.

written by David S. Lee

TODD PUSSER

TODD PUSSER

TODD PUSSER

Longleaf's cones and needles are distinctive among pines. A well-established stand can support species such as the pine warbler and the pine barrens treefrog, which are found rarely outside that type of habitat.

Clearing the underbrush

The restoration methods are straightforward. The ground around the hardwoods is treated with Velpar early in the growing season. In my case, the chemical will be hand spread—it would be impossible to get any sort of spreader through the dense undergrowth. The chemical kills the hardwoods but has no effect on the pines. By applying the Velpar by hand, I can retain little islands of woody shrubs and spare a few of the larger turkey oaks. The acorns of turkey oaks have the highest wildlife food value of any oak. They are important forage not just for fox squirrels and turkeys, but also for many species of mice and other inconspicuous rodents. Once the woody vegetation is dead and dry, the site is burned. With the removal of all the undergrowth and the thick leaf litter that now covers the ground, herbaceous plants will take hold. Several burnings may be necessary in the first two years to remove all the dead hardwoods and to kill off any root sprouts and seedlings that recolonize the site.

Three hundred years ago, longleaf pine savannas dominated much of the coastal plain of southeastern North America. Writing in 1713, John Brickell described these open grassy pinelands as "Pleasant and delightful Savannahs or Meadows with their Green Liveries interwoven with various kinds of beautiful and most glorious Color and fragrant Odours which several Seasons afford. They appear at a distance like so many Pleasant Gardens being intermixed with a variety of Spontaneous Flowers of various colours." Clearing for agriculture, cutting wood for housing and European demand for naval stores removed much of the forest. Fire prevention practices and the planting of vast pine plantations with faster-growing species of pines all but eliminated this community from the Southeast. Old-growth stands of longleaf are nearly nonexistent.

The original longleaf community was dependent on fire. Frequent lightning-induced summer fires swept across the ground, using fallen pine needles and dry grasses as fuel. Such fires burn fast but kill off invasive upland plants and competitive hardwoods. The plants of the pine savannas are all fire resistant to various degrees, growing back quickly after the scorching blazes. The black smudging at the bases of the pines results from decades of random ground fires.

Flowering plants benefit from the ash released during burning: The ash neutralizes the acidic soils and releases nutrients that revitalize the entire plant community. And as Brickell reported, the herbaceous ground cover is an ever-blooming sequence of specialized wildflowers appearing in disorganized, scattered clusters throughout the prairie of green grasses.

The big picture

The longleaf restoration was part of a larger effort for my wife and me to restore a 130-acre tract of land we own in eastern Bladen County. Our goal is to make it more favorable for native wildlife. In 2003 we initiated a process to include our land into a cooperative stewardship program with the N.C. Wildlife Resources Commission and the N.C. Forest Service. This will reduce our taxes, and we plan to add the land to a local land trust so that all our restoration and stewardship efforts do not become undone in the future by someone who has his sights on the property for a strip mall.

Eleven acres is too small a parcel for doing any sort of meaningful bird survey. With a site three times this size, there is a world of comparable information on species density for different habitat types and different geographic areas. But with small tracts, it is almost impossible to avoid species using the edges of the habitats and others coming in from adjacent ones. Many species of birds have territories that exceed the size of my study plot. So I simply did a relative-abundance and presence-and-absence survey over 15 random days during the core of the breeding season. From more detailed studies I had done in various types of longleaf habitats and of the characteristic birds of prime habitats in southeastern North Carolina, I knew that I could expect modest densities of up to about 40 species of birds. Characteristic ones include quail, wood peewees, great crested flycatchers, brown-headed nuthatches, pine warblers, yellow-throats and meadowlarks.

Historic accounts of travelers imply vast stands of longleaf along the South River. There are reports of thousands of barrels of turpentine distilled from the trees and stored along the banks of the river while people awaited spring floods that would allow small, shallow-water steamboats to transport them downstream to Wilmington. Much of the longleaf in the area was later cut over, and the land shifted to agriculture in the 1800s. The telltale parallel furrows can still be seen on our 11-acre restoration site. Prior to commercial fertilizers, it was standard practice to farm the rich soils of river floodplains. For rivers such as the South where flooding was frequent, farmers would clear adjacent lands and use mules during periods of winter drought to haul nutrient-rich sediments from the floodplain for their fields.

The plants of the pine savannas are all fire resistant to various degrees, growing back quickly after the scorching blazes.

MELISSA McGAW

The author conducts a wildlife survey on his 11-acre longleaf stand. These young seedlings will take decades to become the majestic full-grown trees that form iconic pine savannas.

MELISSA McGAW

TODD PUSSER

TODD PUSSER

TODD PUSSER

Other species closely associated with longleaf pine habitat: Eastern coachwhip, fox squirrel (juvenile shown here) and carnivorous sundew plant.

A simple grave on the edge of our site indicates that the initial farming occurred there in the mid-1800s. James H. Meredith and his wife, Margaret, share a small plot adjacent to the former field. The nearby grave of their infant son suggests that 19th-century agricultural life was hard. I have been told that Meredith was the area's first postmaster when the local post office was in Tomahawk a century and a half ago. Only two other landowners held title to this land after Meredith died in 1890. The second owner was a tobacco farmer who lost the land through foreclosure during the Great Depression. The family who bought it in 1929 for $300 owned the land until we acquired it in the mid-1980s. What row crops were grown in this field are unknown, and I suspect the site had been logged several times prior to the planting of the current longleaf pine stand in the 1970s. The former owner had logged the site in the mid-1900s, and finding that regeneration of the forest was poor because of the nutrient-deficient soil, he decided to plant longleaf after consulting with the forest service.

Taming the tangle

About 15 years ago I tried to clear the understory shrubs and hardwoods by hand. It seemed the tract was small enough that this was feasible. Every few weekends I would spend several hours whacking away woody shrubs and using a bow saw to remove small hardwoods. By the third season, I had put a rather good dent into undesirable vegetation, but looking behind me I saw that in two years it had mostly grown back. Within a few years the undergrowth was so dense that it was hard to see more than a few yards into the forest and all but impossible to walk through it. Shrubs and small oaks dominated the site. In the summer it was a green wall of shrubs and vines; in the winter one could see the ungodly 11-acre tangle of woody limbs and vines.

Removal of much of the woody undergrowth and the initial burning are actually only the first phases of the project. Over time I plan to kill off a substantial number of the pines. This will allow for better growth of the ones that remain, because making the site more open and reducing the canopy will allow more light to reach the ground. By killing only 10 or 15 trees each year, I will provide standing dead trunks to serve as long-term housing for woodpeckers and other cavity-nesting birds. Scattered about our property are remnant plants from a time when much of the land was forested with longleaf. Transplanting a number of these plants to the site will allow them to become established quicker, eventually giving us a proper-appearing savanna. Friends and relatives who spend

countless hours each week working on their lawns, weeding and pruning their rose bushes think we are nuts. But once our work is done, our longleaf stand will stabilize, and except for a controlled burn every three or four years, my natural garden will pretty much take care of itself.

During my prerestoration survey, I found that 28 of 60 breeding bird species we had on our property were associated with this pine stand. Some had their territories entirely within the planted longleaf; others were using only part of the pinewoods and spent a good percentage of their time in habitats immediately adjacent to the site. Additionally, 19 breeding species occurred only in the adjacent forest types and did not appear to venture into the longleaf at all. With the help of Biscuit, we also found 12 of the property's 57 reptile and amphibian species and eight of our 30 mammal species on the small pine stand. Clearly, this parcel was not supporting a diversity comparable to more natural adjacent habitats. I plan to repeat the survey a year after the restoration effort and see how our local breeding birds respond.

It's fun to second-guess who will move in and who will stay. Which species will increase in numbers, and which ones will become scarce? With only 11 acres, this is far from a definitive study, but it will give others interested in similar and perhaps larger-scale restoration projects some idea as to how they will benefit local wildlife. We will certainly see more pine warblers, quail and fox squirrels, but which species already living in adjacent habitats will benefit from my tinkering? Will my forest management recruit additional species of wildlife to the land—birds and other wildlife that did not already occur here naturally? Will the nesting whips abandon this part of the property? Will the chucks return and once again take up summer residence here? Or maybe the habitat restoration will produce a longleaf stand where they can coexist.

I am not one to mess with nature, but the artificial character of the planted pines and the understory plant community that flourished in the absence of fire always bothered me. I am quite curious to see what changes will occur in the wildlife once the restoration is completed and my miniature pine savanna stabilizes. The goal cannot be to see the land return to the way James Meredith found it in the early 1800s. We can never get the state's longleaf community back to where it was at the time of European contact. Yet if enough landowners take advantage of the U.S. Fish and Wildlife Service's program, perhaps little patches will contribute to supporting relict assemblages of the native plants and wildlife that depend on the majestic trees.

Frequent contributor David S. Lee is director of the Tortoise Reserve, an international turtle conservation organization.

It's fun to second-guess who will move in and who will stay. Which species will increase in numbers, and which ones will become scarce?

MELISSA McGAW

MELISSA McGAW

TODD PUSSER

Great beauty exists in small doses in a pine savanna: at left, an Eastern black swallowtail butterfly on a Carolina lily. Fire is perhaps the most valuable management tool for longleaf pine—note how the seedling is unharmed by a brush fire.

TOUCH-ME-NOTS *in the garden*

Saddleback Caterpillar

Watch it!

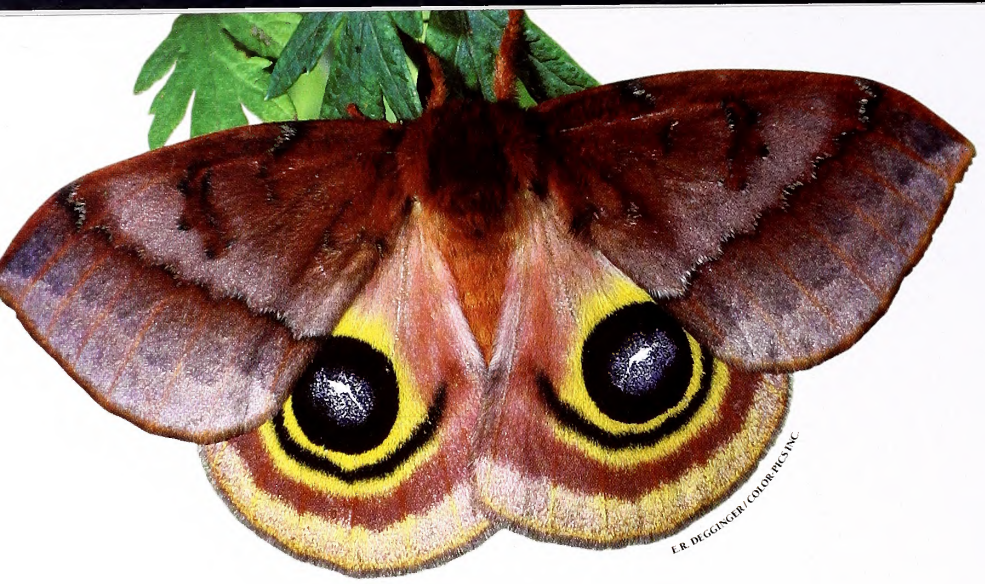
These showy caterpillars defend themselves with venomous spines that can issue a painful sting.

I spend a lot of time in my yard—watching wildlife, taking pictures and enjoying the plants and animals I have nurtured in my Chatham County woods. Every now and then, something will surprise me. While aimlessly pulling chickweed from the wildflower bed last summer, I suddenly felt a sharp, stinging sensation on my forearm. I instinctively yanked away, only to see the culprit clinging to an iris leaf. It was a familiar critter: a saddleback caterpillar, one of the most bizarre-looking moth larvae you will ever see. It is also a member of the relatively rare group of so-called stinging caterpillars.

Stinging caterpillars do not sting in the same way as bees and wasps. Female bees and wasps have stingers which are actually modified egg-laying structures that penetrate your skin and inject venom. Stinging caterpillars have no such stinger, but rather possess specialized spines or setae (bristles) known as urticating hairs. So, in the case of my painful forearm, the perpetrator was an urticator. Some words just beg to be said out loud, and "urticating" is one of them. The word is derived from the Latin *urtica*, referring to a stinging nettle that causes a burning rash upon contact. A couple of other unusual words should be mentioned—erucism (from the Latin *eruca*, caterpillar) is a name given to the dermatitis caused by contact with certain caterpillars. Lepidopterism (Latin *lepido*, scale, plus Greek *ptera*, wing), is irritation caused by a few species of adult moths.

WRITTEN & PHOTOGRAPHED
BY MIKE DUNN

Io Moth Caterpillar



The Io moth is perhaps the most attractive adult that comes from this group of stinging caterpillars. The other adults are nondescript gray-brown with little or no pattern.

The urticating hairs serve as an effective means of protection against predators and clumsy gardeners who might cause harm to the otherwise soft-bodied larvae. These hairs can be of two types. Envenomating hairs are hollow spines that contain venom produced by a gland at the base. When contacted, as when my arm brushed against the saddleback, the tips of the hairs break off and release the irritant. These hairs may be scattered about the body of the caterpillar, mixed in with harmless hairs, or they may be grouped in clumps.

Many other caterpillars have nonenvenomating hairs that easily dislodge from the larvae on contact. They can cause a mechanical irritation on the skin similar in effect to that from handling fiberglass insulation. In some species these fragile hairs can also become airborne and settle on skin or even, in rare cases, be inhaled. Some species retain their stinging capabilities after death, and even molted skins and a few cocoons may still sting if handled.

Adverse human reactions from exposure to certain caterpillars have been recorded for hundreds of years. The ancient Greeks were among the first to record problems associated with contact with certain caterpillars. In the New World, a Brazilian priest noted in 1560 the locals' fear of the pain that followed skin contact with certain moth larvae. Their name for these caterpillars, *tata-rana*, translated to "like fire." More recently, there have been cases of occupational asthma among a few researchers studying certain species of caterpillars under laboratory conditions, where large numbers of the larvae were raised in confined spaces.

Some of the more unusual reports of caterpillar-induced illnesses include public school closings in Texas, 600 cases of caterpillar dermatitis among Israeli soldiers in 1959 and some recent deaths from a species in South America. Outbreaks of the puss moth caterpillar near San Antonio in 1923 and Galveston in 1951 were responsible for numerous stings on children, resulting in the closure of schools for several days. The larvae were apparently dropping from their host trees on a few school sites, stinging exposed skin of the arms, on the face and especially behind the neck under open shirt collars. In the Israeli army example, about 10 percent of a force of 6,000 soldiers on desert maneuvers experienced skin irritations due to a population irruption of a species of tussock moth larvae. And in Brazil, there have been several cases of severe internal bleeding and even death from multiple stings by communally feeding larvae of a species of giant silkworm moth.

In spite of the potential for pain, I'm always excited to find these strange beasts in my yard (for one thing, they are a sure conversation starter). I usually encounter a few saddlebacks each summer by being on the receiving end of their unusual defense mechanism. The usual scenario of a saddleback encounter involves weeding or moving some leaves to get a photo of something, then the sudden pain, followed by my yanking the appendage away from whatever unforeseen danger lies before me. The pain is immediate and somewhat like a mild bee sting. Within a few minutes, a small reddish welt appears wherever bare skin has brushed the saddleback. The typical result is a short line of reddish splotches on the offending arm or hand. The pain is short-lived, but the redness and slight swelling may persist for up to an hour. A reminder: Just as with bee stings and insect bites, we humans tend to vary in our sensitivity to such things, so your reaction may be milder or, rarely, much greater than mine.

First aid for exposure to one of the stinging caterpillars is similar to that for other stings. Tips from a poison control center include applying adhesive tape lightly over the affected area and peeling it off to remove any broken spines from the skin; washing with soap and water; applying an ice pack to relieve the pain and swelling; applying topical steroids (hydrocortisone creams) to relieve the itching and burning; and taking oral antihistamines to relieve symptoms. In the extremely rare event that a serious reaction occurs (shortness of breath, severe swelling and redness beyond the sting site, nausea, etc.), you should seek immediate medical attention. The best way to avoid the pain is to avoid the caterpillar by wearing gloves, long sleeves and long pants when working in areas known to have the urticators.

Luckily, our stinging larvae rarely cause any problems except a quick startle that usually leads to no more than an interesting story for friends and family. Are all "hairy" caterpillars dangerous? The answer is no. Although many species of caterpillars (larvae of moths and butterflies) possess conspicuous horns, hairs and/or spines, only relatively few possess structures that are urticaceous. Worldwide, fewer than 12 families of Lepidoptera are considered stingers, the vast majority being the larvae of moths.

Of the estimated 11,000 species of butterflies and moths in the United States, fewer than 50 species are reported to have urticating hairs. In North Carolina, most of us are likely to encounter fewer than a dozen species of painful larvae. That means there are many more harmless look-alikes out there than problem species. Deciding whether one is harmful or not merely by looking at the "hairiness" factor is not an easy task. But there is no need to fear caterpillars, one of our most fascinating groups of insects. Caterpillars play an important ecological role as herbivores and as prey for countless insects, birds and other wildlife. Better to learn to identify our few common species of stinging caterpillars and, when in doubt, decline the hands-on test.

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SLUG CATERPILLARS

Several members of this unusual group of caterpillars possess urticating spines. Larvae of this family have suckerlike structures on their undersides and seem to glide rather than crawl. Many are quite ornamented with various protuberances and spines; others are vividly patterned and colored.

1 Saddleback Caterpillar

Described by one Louisiana writer as resembling a miniature Mardi Gras float, this is probably our most common stinging caterpillar. Unmistakable even in its early stages (many caterpillars change dramatically in colors and patterns from hatching to final molt), it is recognizable because the middle of the body is green with a large, dark brown spot in the center. This pattern is said to resemble a saddle and blanket, hence the common name. Either end of the larva has prominent "horns" armed with numerous stinging spines. Clumps of spines also occur along the lower edge of the abdomen. The larvae are common in a variety of habitats from gardens to woodlands, where they feed on a wide range of plants.

2 Nason's Slug

I usually find one or two of these subtle beauties each season. Their stinging sensation is supposedly mild. The spines are usually barely exposed but can be projected outward when the larva is threatened. It feeds on a variety of tree leaves.

3 Monkey Slug (Hag Moth Caterpillar)

Looking more like a crumpled, fuzzy leaf than a caterpillar, the monkey slug has a hairy, lobed appearance that is said to make it resemble the cast-off skin of a tarantula. Up to nine pairs of "arms" of varying lengths coming off the edges of the body are supposedly armed with stinging spines. These are purportedly easily broken off, so you may see larvae with fewer. The overall look is also said to resemble the disheveled hair of an "old hag," leading to one of the common names. The larvae feed on a variety of trees and shrubs including oak, persimmon, hickory and ash.

OTHER STINGING CATERPILLARS

1 Io Moth

Reaching over 2 inches in length, this is an easily recognized species found on a variety of host plants, from buttonbush to willow. Young Ios are gregarious feeders that usually separate after their third molt. In the early stages they are generally brown, and then they turn dull orange, with the final stage being bright green. The red-and-white midstripe is characteristic. Raised bumps bearing branched spines occur on each segment.

2 Puss Moth

These innocuous-looking larvae have been called by many colorful common names—asp, opossum bug and, in Mexico, *el perrito* (little dog). But don't let their cuddly appearance fool you. They reportedly pack the most potent punch of all North American stinging caterpillars. The 1-inch larvae have long, gray-to-brown hairs that peak like a roof over their backs, and in mature stages, they taper at one end to a "tail." The larvae pupate over winter in a distinctive cocoon. Looking like a swelling on a twig, it has a trap door on one end from which the adult moth escapes.

3 White Flannel Moth

This colorful crawler reminds me of an insect clown, dressed in its distinctive pattern of yellow, rust and black. I first noticed these communal feeders one night while walking the dogs (by flashlight is a great way to spot caterpillars—if your neighbors don't turn you in). I noticed that something had defoliated several branches on a redbud tree—a closer look revealed several of these beautiful caterpillars feeding amongst the branches. They also feed on oak, elm, hackberry and several other woody plants.

4 White-Marked Tussock Moth

This fuzzy guy is a toothbrush wannabe that is common on a variety of plants both herbaceous and woody. I have never had any problems at all handling these caterpillars, although there are reports of their causing contact dermatitis in sensitive individuals. ◆

Mike Dunn is coordinator of teacher education at the N.C. Museum of Natural Sciences.

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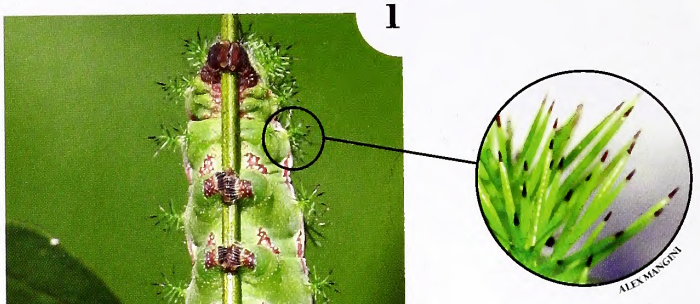

A close-up view of the Io moth caterpillar's cluster of urticating hairs.

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TOUGH-LOOKING NONSTINGERS

These species of caterpillars native to North Carolina look deadly but are actually harmless.

1 **HICKORY-HORNED DEVIL**

2 **IMPERIAL MOTH**

3 **SYCAMORE TUSSOCK MOTH**

4 **HUMMINGBIRD CLEARWING**

NATURE'S WAYS

How Do "Unarmed" Caterpillars Defend Themselves Against Predators?

See Nature's Ways, page 39.

PERRY SUMNER

BIRDS

BANDING STUDY GIVES BIOLOGISTS INSIGHTS ON THE MIGRATIONS OF MOURNING DOVES.

written by Mike Marsh

Shooting was slow, as it often is during a late-September dove hunt. The action was steady enough, though, that my hunting partner, David Franklin, and I had a fair bag of nine doves between us. As Santana, my Labrador retriever, fetched each dove, I placed it inside the game pocket of my hunting vest, not paying attention to any individual bird beyond feeling feathers wet from my dog's mouth. Since our bag was well below a one-hunter limit of 12, I transferred the doves into a plastic grocery bag for David to carry home. He called me that evening as he was cleaning them.

"Guess what I found," he said.

I started going through a mental checklist of what I might have left in his pickup truck after our hunt. But he was so excited, that he blurted out the reply before I could offer a guess. "Two of our doves were wearing bands!" he said.

Though I had bagged many waterfowl wearing aluminum bracelets, I had never even seen a dove wearing the tiny jewelry, so I had not thought to check. An examination showed contact information identical to that stamped into waterfowl bands: Call 1-800-327-BAND, a serial number and LAUREL MD 20708 USA.

I phoned Phil Stone, a wildlife technician at the N.C. Wildlife Resources Commission's Holly Shelter depot. I remembered, nearly too late, that I had spoken with him about the commission's participation in a banding study. Stone looked up the band numbers and discovered that his crew had indeed banded our birds. Both were trapped near our hunting area.

Biologists once relied on call counts conducted during the May nesting season to estimate dove populations. But they realized they needed better information to manage the migratory birds. "In North Carolina, our dove call counts are among the highest in the nation," said Joe Fuller, the commission's migratory game bird coordinator. "But it could just mean our routes are in good dove habitat."

For dove studies, North Carolina is part of the Eastern Management Unit (EMU), which includes all states east of the Mississippi River. The EMU call counts indicate a declining population.

"However, we have other sources besides call counts," Fuller said. "We also record the number of doves we see during the call count survey and the more comprehensive Breeding Bird Survey counts every bird seen, including doves. Those were telling us the dove population was stable or increasing. After a review of available data, we recognized that we could do a better job of monitoring dove populations."

IN THE HAND

To gain more information, the U.S. Fish and Wildlife Service began a new three-year nationwide dove banding study in 2003. It began as an experimental project, but has shown enough success it will likely be continued. "It's similar to waterfowl banding," Fuller said. "It will tell us harvest and survival rates and provide information on where and when doves are harvested. We now know most doves banded in North Carolina are shot close to where they were banded, during the first two weeks of hunting season."

LOTS OF DOVES, LOTS OF BANDS

North Carolina has one of the highest banding quotas in the nation because of its relatively high call count results and large geographic area. Though most states have a banding quota of 500 to 1,200 doves, North Carolina's quota was 1,380 in 2003, 1,660 in 2004 and 1,380 in 2005.

Doves are captured between July 1 and Aug. 15. Young birds are old enough to fly by then, and the timing of the banding period allows trap bait to be removed before the hunting seasons open so there won't be a compliance problem with baiting laws. Some states band doves at public hunting areas and some at private sites.

The trap is a 2-foot by 2-foot by 8-inch wire cage with no floor and a door in the top. Two funnel openings operate much like those of a crab trap. Doves walk in but can't find their way out. The traps are placed upside down adjacent to millet or other seed. Once doves are accustomed to the trap, it is flipped over. Commission personnel check it daily, crimp leg bands on captured doves, and record where and when the birds are captured and whether they are young doves captured during their hatching year (HY) or adults captured after their hatching year (AHY). Although the state met its total banding quotas for the three-year study, it did not always meet its goal for banding HY doves.

Our dove, No. 1613 74183, was an AHY female banded July 2, 2005. The other dove, No. 1583 97577, was an AHY male banded July 22, 2004.

"The male probably migrated, then returned to the same area it was banded," Fuller said. "Doves are seed eaters. When the ground freezes or is snow-covered, doves have to move to find food."

A total of 184 bands were recovered in North Carolina from the first two years of the study. Two doves banded in North Carolina were recovered in South Carolina and Florida. Several doves banded in other states were recovered in North Carolina.

"We had five bands from South Carolina, one from Georgia, one from Maryland, three from Pennsylvania, two from Ohio and one from Michigan," Fuller said. "We are getting some good information for a more objective approach to dove harvest management. There are no overreaching concerns over dove populations on large geographic scales, but banding data can help us decide when and if we ever need to change hunting season regulations. North Carolina is a very important dove state in terms of dove populations and in terms of numbers of dove hunters. That's why we have one of the highest banding goals in our management unit."

North Carolina is grouped into the South Atlantic subunit of the EMU. There are three dove management units, similar to the four waterfowl flyways with which duck hunters are familiar. The EMU includes all states east of the Mississippi River. The Central Management Unit (CMU)

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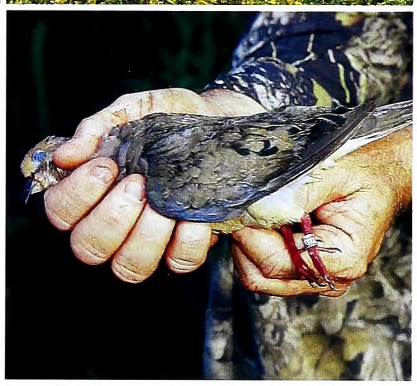

MIKE MARSH

Information from dove bands helps biologists manage the species. When a hunter kills a banded dove, he reports the serial number. To encourage reporting, some gold bands (far left) offer a $100 reward.

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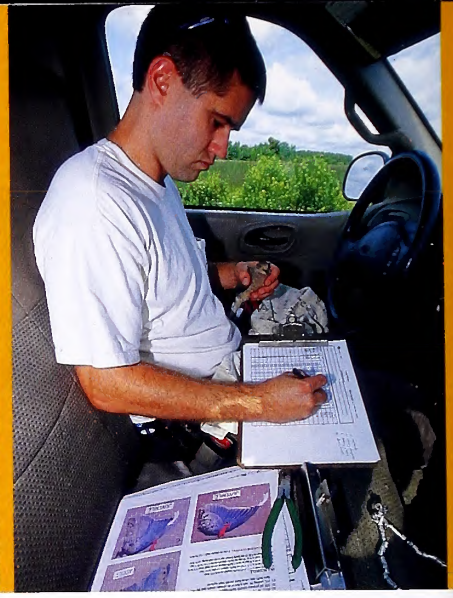


includes all states west of the Mississippi River and east of the Rocky Mountains. The Western Management Unit (WMU) includes all states west of the Rocky Mountains.

Dave Otis, unit leader of the Iowa Cooperative Fish and Wildlife Research Unit at Iowa State University, compiles band information. He supervised graduate students as they strung bands together and completed data collection forms sent to the 29 participating state agencies. Seventeen of the states are in the EMU, eight in the CMU and four in the WMU. Otis and his students also set up workshops for wildlife personnel, resulting in considerable travel.

State participation was vital to the study because the regional subunits are based on doves sharing similar habits and habitats in smaller geographic areas. Although doves do migrate, the study is showing that most doves are harvested close to where they are banded.

REFINING REGULATIONS

"What's envisioned is that harvest regulations will be based on a harvest unit scale, as is currently done with waterfowl," Otis said. "We need a number of states in each of those management units, and we need demographic information on these birds. We need to know survival rates, harvest rates and migration patterns. There are also secondary things we need to know, such as how many birds in a certain area are harvested, and what the harvest distribution is."

While the banding study is patterned after the USFWS waterfowl-banding program, doves are not ducks. Unlike waterfowl, doves do not often migrate long distances before being harvested, so state-level participation is vital to the study. Without prior banding studies, even that tidbit of information would not have been known.

"One key aspect of the program is that for the last two years, we banded a proportion of doves with $100 reward bands," Otis said. "Based on our data with waterfowl, if a hunter shoots that bird, it's enough money to make him report it. That allows us to do a whole lot of other things in terms of a future banding program. Not every hunter reports every band. We surmise from waterfowl band returns that about half the bands recovered are reported. But we know nearly 100 percent of reward bands are reported."

That allows a comparison between reported reward bands and non-reward bands and the calculation of a reporting rate estimate. This information is a critical piece of the equation when attempting to discern harvest rates, i.e., the proportion of the population that's harvested each year. A similar study hasn't been done with doves for over 30 years, and the process has changed a lot since that initial study. Previously hunters had to report bands by mail, but now they can also use the telephone or Internet.

Banding quotas were set up on a regional basis, based on a previous study undertaken in the 1960s. States were grouped together by estimated breeding populations.

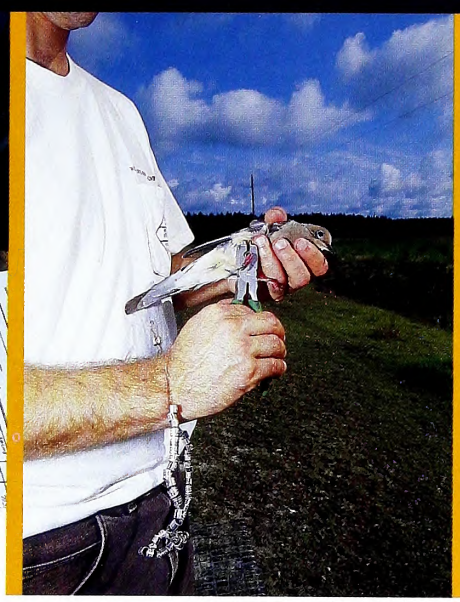
"I asked each of 13 regions to band 2,000 birds," Otis said. "A region is a breeding population where doves have the same basic survival rates and movement patterns. It's arbitrary, but we will revisit this method of grouping now that the three-year pilot study is complete. Each state was given a separate quota based on geographic area and call count surveys. A state with more birds was asked to band more birds."

EMU states experienced the best success at meeting or exceeding quotas. CMU states generally met quotas. WMU states had difficulty because their territories are larger, and biologists must travel longer distances to banding locations.

"Overall, everybody greatly exceeded our expectations," Otis said. "We wondered if they could band these numbers of birds. But states did some fantastic fieldwork on their own dimes. It was a great example of federal and state cooperation. The U.S. Fish and Wildlife Service put up over $100,000. When I applied for the grant, I showed the matching states' contributions at more than $1 million, and I'm sure the states have contributed far more. The federal government wouldn't have participated otherwise. Fish and Wildlife contributed the cash rewards and funded the data compilation."

Nationwide, approximately 95,500 doves were banded and 5,000 bands were recovered. Nearly an equal number of birds were banded each year. But there was a big difference between management units. Around 50,000 were banded in the EMU, 35,000 in the CMU and 10,000 in the WMU.

In a parallel but currently informal pilot study, some state biologists have collected wings from harvested doves in an attempt to assess annual recruitment or the number of doves added to the population each year. Doves are aged by wing plumage characteristics, but this can become confusing as some portion of immature doves have lost these characteristics and thus appear as adults, especially later in the hunting season.



Banding mourning doves is a relatively simple process. After a dove is trapped, a biologist places it into a bag for processing. He records the band number, date and place of capture and determines from examination of the dove's wings if it is from the current hatch year or is an older bird. The biologist also will note the dove's sex, if it is an after-hatch-year bird. Then he attaches the band loosely on its leg. In a matter of several minutes, the dove is released.

IMAGES BY MIKE MARSH

Data collected during the banding program together with the wing collection project are both needed to ascertain annual recruitment. This pilot study is being modeled after other successful U.S. Fish and Wildlife Service wing collection programs, including those where selected hunters submit duck and woodcock wings and goose tail feathers. If successful, the service's wing collection programs may be formally expanded to include doves.

WHAT'S BEEN LEARNED

"We will know much more once we synthesize the results over the summer of 2006," Otis said. "But we've already found out a few things. The estimated harvest rates are already very interesting. We've found that young doves have higher harvest rates than adult doves. The same is true of waterfowl, so you would expect that with doves. Since state biologists decide where to put their banding sites, different harvest rates occur. Some biologists band doves at state hunting areas where there is lots of hunting pressure, and some utilize private sites with low hunting pressure."

In North Carolina, the number of banding sites has varied between 35 and 40. Reports are based on 10-minute quadrangles of latitude and longitude, so there are occasionally two or three banding locations within one quadrangle.

"Banding sites are fairly well distributed across the state at locations as convenient as possible to our employees," Fuller said. "Since our management crews are distributed throughout the state, it distributes the banding. Our crews spent about 170 man-days during each year of the study."

From preliminary data, including the banded doves David and I harvested, it is becoming obvious that most of North Carolina's banded doves are harvested at or near in-state banding locations. That information could skew the data toward higher-than-actual harvest rates, compared to band return data taken over a broader geographic scale. Therefore, it is only by examining data on a regional scale, where biologists have selected banding sites of widely varying characteristics, that solid conclusions can be drawn.

Hunter recruitment and retention are today's watchwords. Many hunters enter the sport as small-game hunters, and doves are the nation's most hunted migratory game bird. Therefore, nurturing healthy dove populations is vital to ensuring the future of hunting. Nationwide, hunter numbers are falling, and that is bad news for wildlife, rural economies and budgets of state and federal wildlife agencies.

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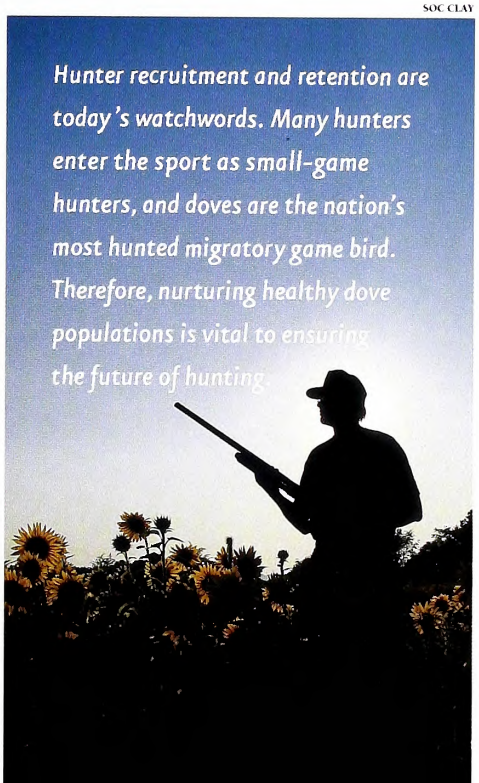


"There are about as many dove hunters as there are waterfowl hunters, and the number of doves is far greater than the number of waterfowl," Otis said. "Doves may be our most valuable asset for hunter recruitment and retention, because many hunters are initiated into the sport when they are children by an adult who takes them dove hunting. The information we gain from banding doves and receiving band reports is essential to the wise management of the country's most popular migratory game bird, and hunters are a critical part of this process. Hunters need to realize it's very important to report dove bands."

One dove banded near Asheville in August 2003 was recovered in Florida in January 2005, which was certainly newsworthy to the hunter reporting the band. Though curiosity compels most hunters to learn where their birds were banded, some think it's too much trouble to report them. Others, like me, forget to check the legs of such small game birds.

"I had one group of hunters who learned about the banding study after the season had been open for some time," Fuller said. "They went back to where they had dressed some doves and found some bands. Every band tells us something important, so hunters should remember to check for them."

Wilmington writer Mike Marsh is a frequent contributor to Wildlife in North Carolina.

North Carolina Hunting Seasons 2006-2007

SPECIES		HUNTING SEASON	DAILY LIMIT	POSSESSION	SEASON
BLACK BEAR		See *Regulations Digest*	1	1	1
DEER[1]			2	6[2]	6[2]
	Bow and Arrow	Sept. 9–Oct. 6 (Eastern) Sept. 11–Oct. 7 and Oct. 16–Nov. 18 (Western) Sept. 9–Nov. 3 (Central) Sept. 9–Nov. 10 (Northwestern)			
	Muzzleloading	Oct. 7–Oct. 13 (Eastern) Oct. 9–Oct. 14 (Western) Nov. 4–Nov. 10 (Central) Nov. 11–Nov. 17 (Northwestern)			
	Gun	Oct. 14–Jan. 1 (Eastern) Nov. 20–Dec. 9 (Western) Nov. 11–Jan. 1 (Central) Nov. 18–Dec. 16 (Northwestern)			
	Gun, Either Sex and Special, Either Sex	See *Regulations Digest*			
WILD BOAR		Oct. 16–Nov. 18 and Dec. 11–Jan. 1	1	1	2
WILD TURKEY	Either Sex Bearded Turkey Only Youth Hunt	Jan. 15–Jan. 20[3] April 14–May 12 April 7 *(statewide on private land)*	1 1 1	1 *(Annual bag limit is 2 wild turkeys. See Regulations Digest for details)* 2	2
EARLY CANADA GOOSE SEASON		Sept. 1–Sept. 30	8[4] *(except for part of Dare County where limit is 2)*	16[4] *(except for part of Dare County where limit is 4)*	None
DOVE		Sept. 2–Oct. 7 (noon until sunset from Sept 2–Sept. 9; thereafter, shooting hours are ½ hour before sunrise until sunset) Nov. 20–Nov. 25 Dec. 18–Jan. 13	12	24	None

SPECIES		HUNTING SEASON	DAILY LIMIT	POSSESSION	SEASON
RAILS, MOORHEN & GALLINULE	Moorhen & Gallinule	Sept. 1–Nov. 9	15	30	None
	Clapper Rail, King Rail	Sept. 1–Nov. 9	15	30	None
	Sora Rail, Virginia Rail	Sept. 1–Nov. 9	25	25	None
EARLY TEAL SEASON		Sept. 15–Sept. 24 (east of U.S. 17 only)[5]	4	8	None
COMMON SNIPE		Nov. 14–Feb. 28	8	16	None
WOODCOCK		Dec. 15–Jan. 13	3	6	None
RED & GRAY SQUIRREL		Oct. 16–Jan. 31	8	16	75
FOX SQUIRREL		Oct. 16–Dec. 31 (only in 23 counties; season closed elsewhere; see *Regulations Digest*)	1	2 10	
RABBIT Including Box Trapping		Nov. 18–Feb. 28	5	10	75
QUAIL		Nov. 18–Feb. 28	6	12	None
RUFFED GROUSE		Oct. 16–Feb. 28	3	6	30
PHEASANT Non-native Male Pheasant Only		Nov. 18–Feb. 1	3	6	30
RACCOON & OPOSSUM		Oct. 16 (sunrise)–Feb. 28	No restriction on opossum (see *Regulations Digest* for bag limits on raccoon)		
BOBCAT[6]		Oct. 16–Feb. 28	No restriction		
FOX		Nov. 19–Jan. 1 and Jan. 6–Jan. 27	Limited to certain counties, see *Regulations Digest*		
MIGRATORY WATERFOWL		Federal regulations may be obtained at www.ncwildlife.org or by calling toll free 1-800-675-0263 after Labor Day			
COYOTE		No closed season or bag limits. Electronic calls allowed			
GROUNDHOG		No closed season or bag limits			
NUTRIA		No closed season or bag limits (except Currituck County, see *Regulations Digest*)			
BEAVER		See *Regulations Digest*			
CROW		Wed., Fri., Sat. of each week from June 1 through the last day of February plus Labor Day, Thanksgiving Day and Christmas Day (Seasons shown are valid through June 30, 2007) No bag limits			
STRIPED SKUNK		No closed season or bag limits			

[1] See *2006–2007 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* for approximate boundaries of Eastern, Central, Northwestern and Western deer seasons. For a copy of the *Regulations Digest*, write: N.C. Wildlife Resources Commission, 1722 Mail Service Center, Raleigh, NC 27699-1722 or visit www.ncwildlife.org.

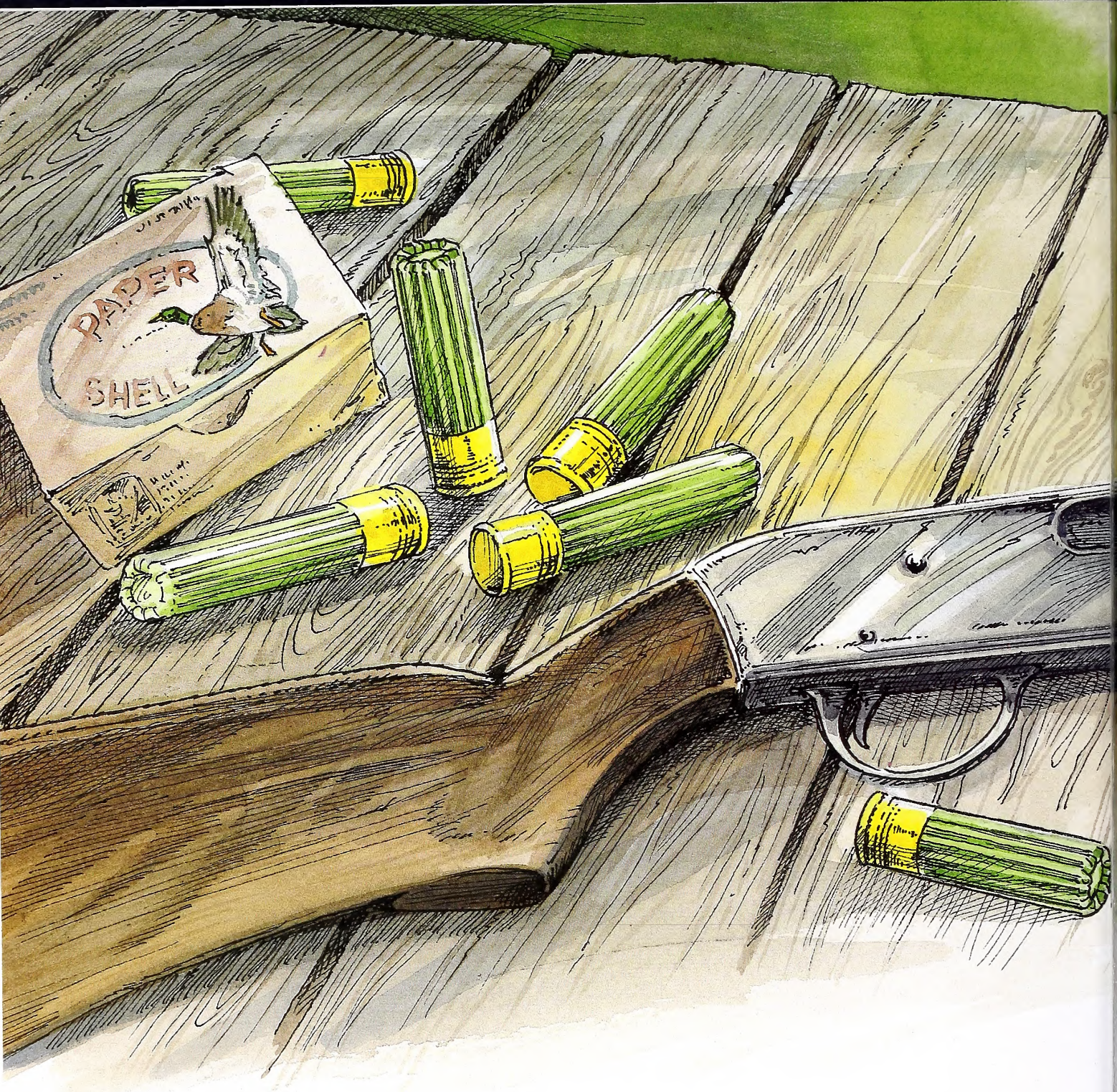
[2] See *2006–2007 Regulations Digest* for buck bag limits.

[3] See *2006–2007 Regulations Digest* for counties open to winter turkey hunting.

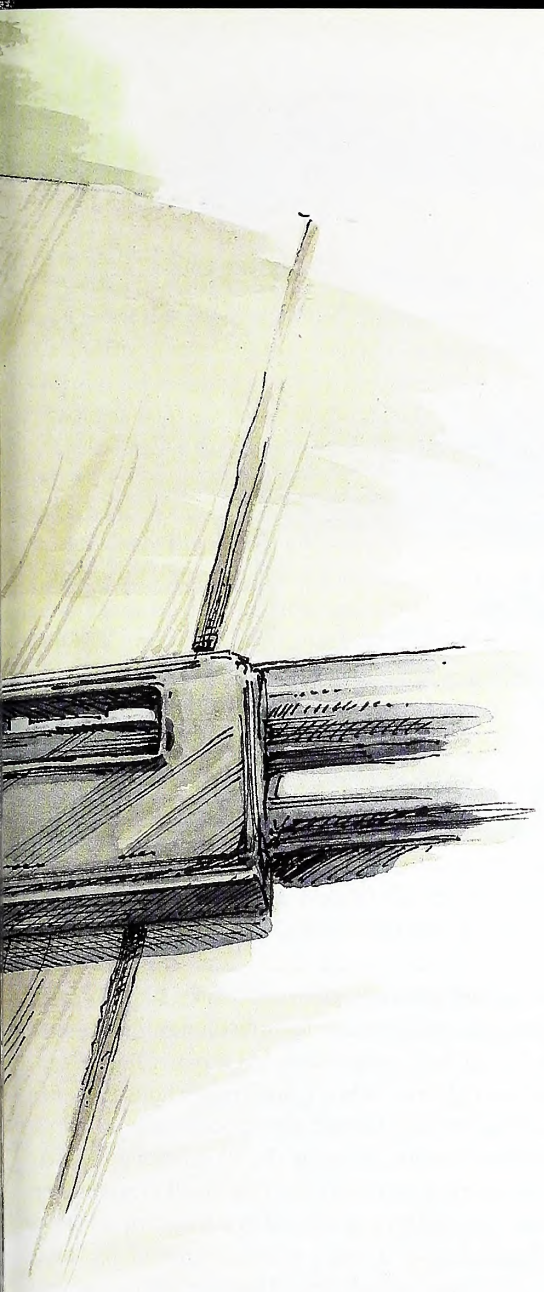
[4] In the area of Dare County that includes Roanoke Island, 1,000 yards around Roanoke Island and 1,000 yards both north and south of the Highway 64 causeway between Roanoke Island and Bodie Island, the daily bag limit for Canada geese is 2 with a possession limit of 4.

[5] Includes blue-winged, green-winged and cinnamon teal.

[6] The bobcat season is closed in the Harmon Den and Sherwood bear sanctuaries in Haywood County.



Aromatherapy FOR SHOOTERS



The smell of shooting paper shotgun shells invokes a wide range of pleasant hunting memories from days gone by.

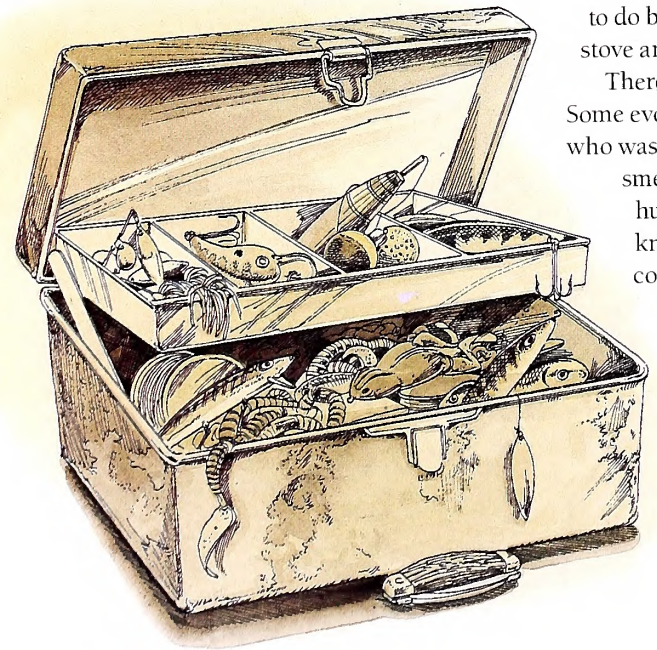
We were at the trucks one day loading our equipment to shoot a round of sporting clays. One of the guys was dumping shells in his vest when my friend asked, "Are those paper shells you're shooting?" "Sure are," was the reply. Expecting something to do with shot velocity or pattern density, he then said, "You don't see those much. Why do you use them?" The fellow smiled wryly and gave a short reply: "I like the smell." I also smiled, because I had a box of paper shells that day for the same reason. Sometimes when I shoot clays, I'll pull a fired hull out of my vest and smell it while waiting my turn to shoot. I'm immediately transported to a different world at a different time, that of my youth.

Scientists call it the "Proustian effect," something that evokes a vivid memory with a distinctive odor. It's really one of the few ways we have of using our sense of smell to enjoy our outdoor experiences. Let's face it: if we could smell grouse, quail and other game birds, we wouldn't need bird dogs. And the world would be worse for it. Nope, the Creator, in his infinite wisdom, got that one right. A hunter's sense of smell is used for remembrance.

WRITTEN BY DON MALLICOAT & ILLUSTRATED BY CHRIS ARMSTRONG

Paper hulls. I can't explain the difference in smell between paper and plastic hulls. It's just different. What is important are the memories the smell evokes. My first shotgun was a little J.C. Higgins .410 single barrel, and my first box of shells was 3-inch No. 6 paper hulls from Sears. That should give you an idea of about how old I am. When I smell paper hulls just after they are shot, I remember a patient father teaching his burr-headed 10-year-old son how to look for squirrels in the crook of a tree. That was after he made me recite the 10 rules of gun safety from memory before I could shoot my new gun, something I don't need the smell to remember.

I'm reminded of hunting rabbits with Uncle Jim in a foot of snow after a freak winter storm in Alabama. This was before weather radar (again a hint at my age). It was a couple of days after Christmas, and I had just gotten the little .410 from Santa Claus. After my safety training, Uncle Jim invited me to go hunting with him at another uncle's farm. We awakened the first morning surprised to see a beautiful blanket of snow. There was no way out and nothing to do but hunt. We would hunt in the morning, eat lunch while our clothes dried by the gas stove and go back out in the afternoon, for four days straight.



There are other smells that evoke memories. Usually they are smells beyond description. Some evoke bad memories. During one of the post-9/11 anniversary news shows, a reporter who was at the World Trade Center cleanup said the one thing he would never forget was the smell. I hope I never again have to smell the mixture of jet fuel, oil, hydraulic fluid and human remains. If you've ever been at the scene of a catastrophic aircraft crash, you know the smell. I have and I know. I suspect it is something post-event psychological counseling can't remove. Although I can't delete that smell from my hard drive, I like to focus on "good" scents. Paper hulls do that for me.

What smells evoke good memories of your outdoor experiences? What brings back your sporting youth? Is it the smell of coffee boiling and bacon frying at a campsite by the lake? Do you remember the smell of your Dad's tackle box? If you're smiling right now, you know the smell. The old metal tackle box with melted rubber worms and a tangle of Jitterbugs, Lazy Ikes and Hullapoppers. There was a metal stringer in the bottom with a knife, a jar of pork skins, loose split shot and other junk that found its way to the bottom. Oh, and don't forget the rubber frog that every father had—although no one I remember ever caught a fish with one of the darn things.

Besides paper hulls, other smells bring back fond memories. A cool, crisp autumn morning has a smell of its own. Add heavy dew and decaying leaves, and it may bring back memories of a favorite grouse covert and an old friend who's not here to enjoy it anymore. Throw in a dog wet from the morning dew with the barely perceptible sound of a bell cutting through the fields ahead, and you can start to daydream. Add a freshly shot paper hull, and it's Nirvana on earth.

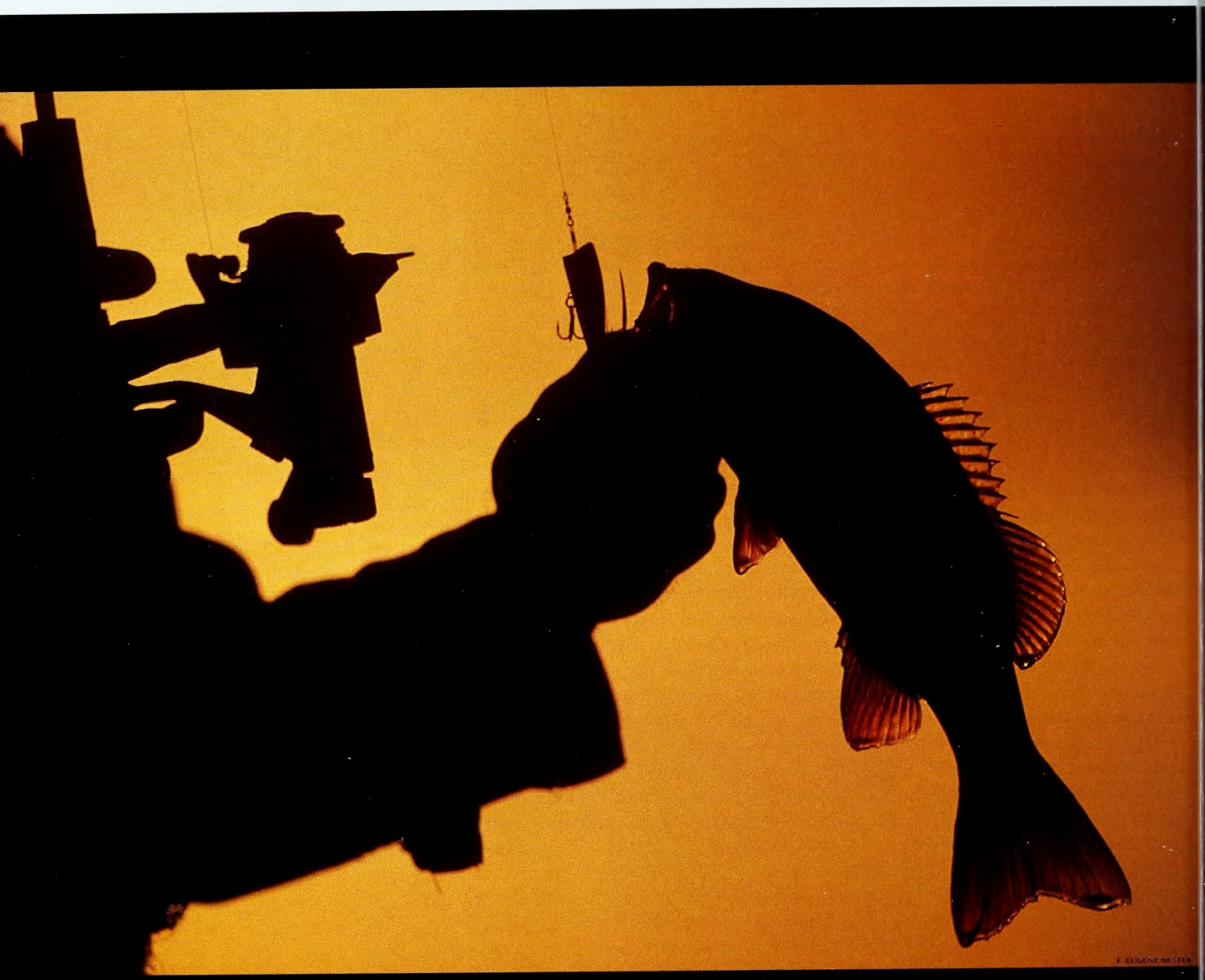
Fresh-cut hay fields remind me of hot summer days slinging heavy hay bales on a moving trailer (not so good a memory). But they also remind me of opening day of dove season in Alabama with Uncle Jim: hot days with a gun hot from shooting wildly at every dove that came by, and Uncle Jim's deep, guttural laugh at a teenager's impatience and lack of shooting skill.

But of all the smells that bring back memories of growing up in the outdoors, paper hulls mean the most. That smell wraps all of my early hunting experiences into one. In middle age, with Dad and Uncle Jim gone, I search for those things that reconnect me to my youth. Paper hulls do that. With paper hulls so hard to find, I shepherd my resources wisely.

An article in the local paper several months back reported the increase in scented candle sales in the United States. In this fast-paced, self-indulgent, hectic world of ours, folks buy fragrances that remind them of other times and burn them around the house to provide a more relaxing atmosphere—aromatherapy of sorts. If a cinnamon-scented candle can bring back memories of Grandma's kitchen, maybe someone should develop a series of scented candles for those of us who hunt and fish. Let's see, I believe "Outdoor Cooking" would go in the kitchen. Maybe "Autumn Woods" would be for the living room. And of course there would be a special place in the den for one labeled "Paper Hulls." ◆

Of all the smells that bring back memories of growing up in the outdoors, paper hulls mean the most. That smell wraps all of my early hunting experiences into one.

Don Mallicoat is a freelance writer living in Asheville. If you know where he can find more paper shotgun shells, e-mail him at dmallicoat@outdrs.net.



BACK TO BASICS WITH *Smallmouth Bass*

written by Kevin Hining

In western North Carolina, excellent smallmouth fishing can be found just minutes away.

Many longtime anglers began their fishing career by grabbing a fishing pole, a friend and a few small spinners or night crawlers, and heading for a nearby stream or river to see what they could catch. This type of fishing didn't require the expensive rods, boats, guides, plane tickets or hours of preparation that many of them have since invested in the pursuit of fish. It was just pure and simple fishing back then.

Sometimes a return to the basics can spark a renewed interest in our favorite pastime and reacquaint us with the reasons we got hooked on fishing in the first place. Our state's rivers and streams are great places to reconnect with that primal urge to fish. We don't have to worry about rigging up half a dozen rods with six different bass lures, ordering an extra spool of fluorocarbon tippet, hitching the boat up, tying several mayfly patterns that are too small to see anyway or greasing the trailer bearings. And we don't need to check the trolling motor battery, either. All we have to do is call a friend, grab a fishing rod and a few lures and walk out the door. Because no matter where we live in North Carolina, there is a river or stream near us, and all have fish to catch. The fishing possibilities that are available to the river and stream angler in North Carolina are too numerous to discuss within the constraints of a single magazine story, so let's focus on one of the many fishing opportunities — the cool-water rivers and streams found in western North Carolina, where smallmouth bass abound.

An Overlooked Resource

When most anglers think of fishing in western North Carolina, they think of fishing reservoirs for largemouth bass, crappies or walleyes, or fishing cold-water streams for trout. Often, the many cool-water rivers and streams found in this part of the state are overlooked. In fact, many people would be surprised at the fishing opportunities that they drive past on their way to fish their favorite lake or trout stream. Smallmouth bass and their smaller neighbors, rock bass and redbreast sunfish, are abundant in these cool-water resources and offer an excellent chance to have a great day of fishing without the crowds that more popular fisheries draw.

Two important attributes of fishing the cool-water rivers and streams in western North Carolina are the ease with which they can be fished and the minimal investment in gear needed to enjoy a day on the water. Although trophy-sized fish may be rare, these species feed aggressively and often, making them great for anyone who enjoys catching fish or wants to introduce others to this pastime. Furthermore, one really needs only a spinning rod and a handful of spinners, jigs or other favorite lures to get started. Fly-fishing cool-water rivers and streams can also be productive, since these species will take a wide assortment of popping bugs, streamers and nymphs.

History and Biology of Smallmouths

In the past couple of years, biologists with the N.C. Wildlife Resources Commission have spent a lot of time experimenting with

methods of sampling fish communities in cool-water rivers and streams. Currently, most of the data have been collected from the New, Little Tennessee and Nolichucky rivers. Although these rivers are well known by many anglers, fishing is rarely crowded. In fact, outside of summer weekends, these resources can often appear deserted. Low fishing pressure is even more apparent on the many smaller streams that feed these rivers, as well as foothill tributaries of the Yadkin, Catawba and Broad rivers.

Smallmouth bass inhabit cool-water portions of rivers and large streams. Because of this temperature preference, they are found primarily in the mountains and foothills of western North Carolina, sandwiched between upstream trout populations and warmer downstream reaches favored by largemouth and spotted bass. Smallmouth bass are native to the western side of the Appalachian Mountains in North Carolina. However, historical stockings of this species in the foothill streams east of the Appalachians have expanded its range into several Atlantic Ocean drainages, such as the Yadkin, Catawba and Broad rivers.

Rocky structure such as boulders and ledges, along with a variety of currents ranging from fast riffles to slow pools, is typical of the rivers and streams that harbor smallmouth bass. These fish eat a variety of foods, including fish, insects, frogs and even small rodents. However, crayfish are one of their favorite foods throughout their range. Spawning occurs in areas with slow current running over sand and gravel in the spring when water temperatures approach 60 degrees Fahrenheit. As with largemouth bass, several females may spawn in the nest of a single male. Males guard the nest from predators for several days until the eggs hatch and the fry mature. A week or two after hatching, the young fry gradually disperse, feeding on small aquatic insects and zooplankton until they grow large enough to eat other food items. In general, smallmouth growth and life expectancy vary widely depending on water temperature, food availability and habitat. In the rivers and streams of western North Carolina, a 5-year-old smallmouth may be only 10 inches to 12 inches long, much smaller than a similar-aged smallmouth in a reservoir would be. As a result, 3-pound to 4-pound smallmouths are less common in our rivers and streams than in reservoirs, but they are out there.

These fish eat a variety of foods, including fish, insects, frogs and even small rodents. However, crayfish are one of their favorite foods throughout their range.

BRUCE INGRAM

The fighting ability of smallmouth bass has been praised for decades, but it's probably a combination of factors that hooks so many people on stream fishing for smallmouths. Even though the number of houses along our cool-water rivers and streams is on the rise, the setting is still very rural. A combination of the scenic and uncrowded surroundings and the renowned fighting quality of this fish probably accounts for the loyalty smallmouth anglers have for this species.

As previously mentioned, most of our rivers and streams that contain smallmouth bass also contain rock bass and redbreast sunfish. These species, although smaller on average, are still a blast to catch and often fill the void between smallmouth hook-ups. Rock bass and redbreast sunfish spend most of their time around logs, root masses and large rocks in quiet pools and along stream banks with slow current. Rock bass feed primarily on aquatic insects, crayfish and small fish that they find along the stream bottom. Redbreast sunfish feed primarily on insects, including terrestrial and adult aquatic insects found floating on the surface. Both of these species spawn in the late spring or early summer. Like smallmouths, several females may spawn in the nest of a single male, and the males guard the nest from predators.

The general statewide limit for smallmouth bass is five fish, with a 12-inch minimum size limit and an exception allowing two fish under 12 inches—but there are often additional restrictions depending on your fishing location. There are no creel or size restrictions on rock bass or redbreast sunfish in western North Carolina, but restrictions do exist in other parts of the state. A list of the current fishing regulations is available in the *2006–2007 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest*. The regulations digest, as well as fishing licenses, can

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BRUCE INGRAM

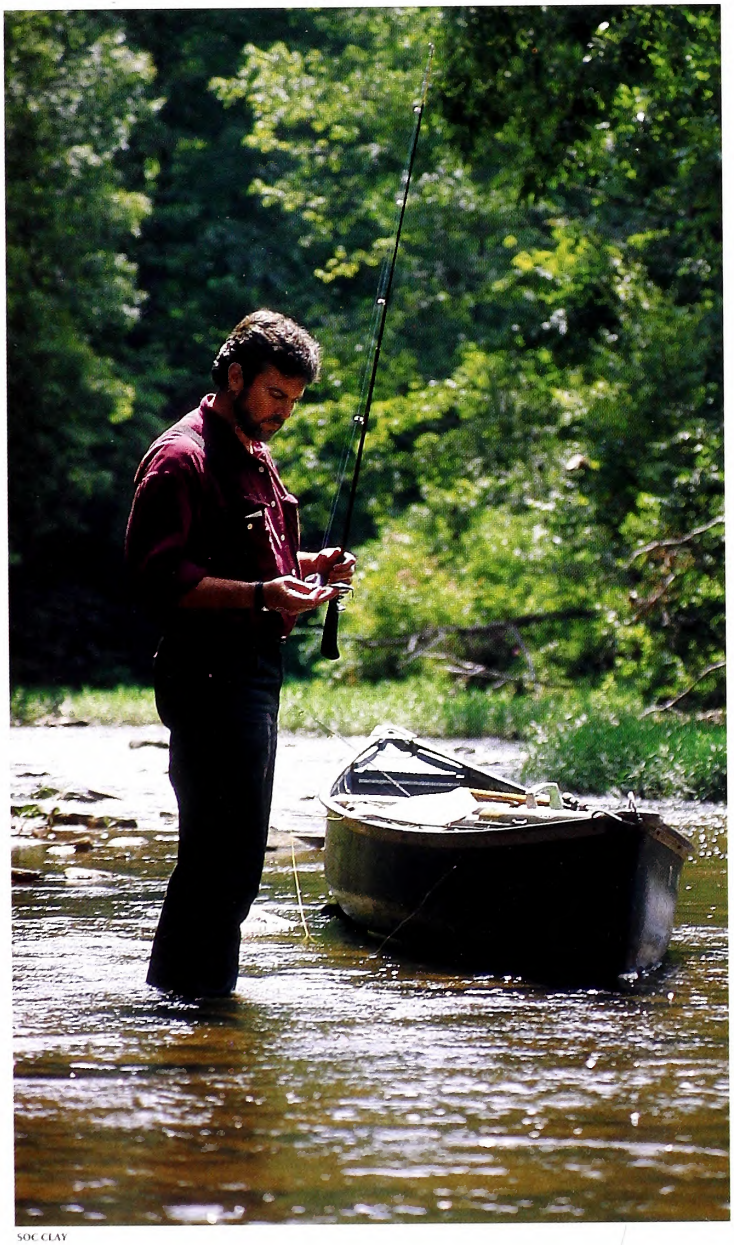
Hellgrammites, both natural and artificial, are good smallmouth bait whether fishing from shore or by canoe.

be obtained from various stores that sell licenses, and directly from ncwildlife.org or by calling 1-888-248-6834.

Fishing for Smallmouth Bass

Finding a stream to fish for smallmouths in the mountains and foothills of North Carolina is easy. Since the cold-water temperatures found in small- to medium-sized streams in the mountains are marginal for smallmouths, larger streams and rivers, such as the South Fork of the New River, North Fork and main stem of the New River, Watauga River, North Toe River, Nolichucky River, French Broad River and Little Tennessee River, are sure bets. In the foothills, streams drop quickly off the Blue Ridge escarpment. Water temperatures warm up along with this drop in elevation, diminishing the streams' suitability for trout and increasing smallmouth, rock bass and redbreast sunfish populations as one travels downstream. These streams can offer great fishing and are the ones that are often overlooked.

Near where I live in Wilkes County, practically all the sizeable tributaries of the Yadkin River contain good smallmouth populations. The lower reaches of these streams — the Reddies River, Roaring River, Stony Fork, Elk Creek, Lewis Fork and Mitchell River to name a few — all offer a good afternoon of fishing. The purpose of mentioning these streams is not to point out that the streams in this area are full of smallmouths but to indicate how common good smallmouth streams are. Similar streams are abundant throughout

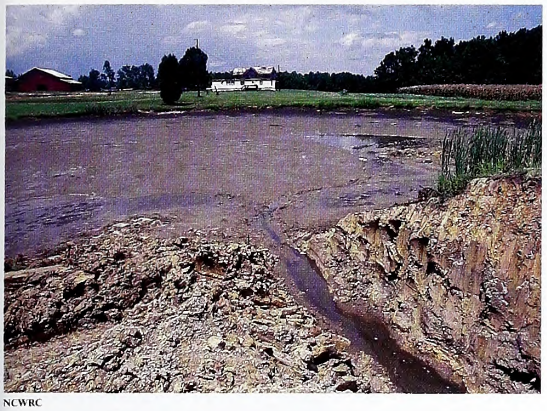


SOC CLAY

Many people fish from a canoe, kayak or tube as they float downstream, and then they get out and wade-fish areas containing exceptionally good habitat.

SOC CLAY

Many cool-water streams and rivers offer ease of access and do not require an expensive boat to navigate.



NCWRC

Sediment from eroding stream banks can kill fish eggs and destroy excellent habitat.

the foothills of North Carolina. Just get out and give them a try. Regardless of the stream you choose, the fishing is usually best from late spring, as water temperatures approach 60 degrees, to early fall. However, many anglers do report good catch rates during warm spells in the colder months.

As previously mentioned, the wide variety of lures that can be used to catch smallmouth bass is one of the great things about this species. Casting live baits such as crayfish, minnows and hellgrammites, as well as using spinners, jigs, crankbaits or soft plastic lures, with a medium-action spinning rod rigged with 4-pound to 8-pound test are all effective methods for catching smallmouths. During the warmer months, smallmouths can also be caught with popping bugs and other floating lures. Smallmouths inhabit a variety of habitats, but in pools and eddies, around ledges and beside banks with a couple feet or more of water are ideal spots to fish. Smallmouths will also move into riffles and areas of faster current, so it never hurts to try these as well.

Most of the lures used to catch smallmouth bass will also work for rock bass and redbreast sunfish. In fact, you have a great chance of catching all three species regardless of which fish you are trying to target. However, redbreast sunfish, and to a lesser extent rock bass, have smaller mouths than smallmouth bass, so many anglers use smaller lures when fishing for them. Bouncing ⅛-ounce crappie-style jigs along the bottom of pools is my favorite fishing technique for rock bass. Tipping these jigs with a worm, crayfish tail or hellgrammite is also reported to work extremely well. For redbreast sunfish, I usually cast ⅛-ounce spinners or fly fish small popping bugs right up against the stream bank in areas with slow current.

Canoeing on our cool-water rivers and streams is a great way to fish for smallmouths. Many people fish from a canoe, kayak or tube as they float downstream, and then they get out and wade-fish areas containing exceptionally good habitat. When fishing from a moving canoe, I usually cast slightly downstream and out to the side of the canoe. This way I can fish a particular habitat before my canoe floats all the way past it. When fishing large pools, I try to paddle around the perimeter of the pool, rather than right through the middle of it, and position the canoe in the lower part of the pool. From this spot, I cast across the pool to the upstream end and retrieve my lure through the pool. Life jackets are a must when float fishing, as many of these streams have tricky currents, and all have large, hard rocks.

The same fishing techniques one would use while float fishing will work on smaller streams that are not big enough for a canoe. I often take a lighter rod with 4-pound test on these smaller streams and fish small spinners, jigs or weighted 4-inch soft plastic lizards, which are also my personal favorite on rivers and larger streams. I generally have better luck moving upstream as I fish, casting to the upstream end of pools or across to the stream bank. As when fishing trout streams, you will encounter many slippery rocks, so good wading boots with felt soles come in handy. If possible, it's best to go with a friend for added fun and safety.

Rivers and streams with good fish populations in western North Carolina, as well as the rest of the state, can be found in a variety of ways, but many are located the old-fashioned way. Just grab a rod, a few lures and a friend and start casting. You never know what you might find—maybe a new favorite fishing spot.

Respect Property and Resources

When fishing North Carolina's rivers and streams, always remember that the majority of them are surrounded by private property. As with many of our trout streams, access and fishing rights are largely dependent on the willingness of the landowner. Therefore, always be courteous and ask landowners if they allow fishing on their property. Trash left on stream banks and vehicles blocking driveways and access roads to fields have resulted in the posting of many streams, and subsequent loss of areas to fish. Please respect private property, pick up any trash you see, and if you aren't sure, always ask for permission before you fish.

There are at least two very important ways we can all ensure fishing opportunities on our rivers and streams for future generations. One way is to prevent the erosion and run-off of sediments into rivers and streams. Sediment irritates fish gills, suffocates fish eggs, affects the feeding of fish that rely on visual cues for finding prey and destroys fish habitats. Leaving vegetation along stream banks by not mowing, weed-eating or removing trees and shrubs is a great way to prevent sediment from entering streams. This riparian buffer can also protect your land during floods.

The second thing we can all do is to pass our knowledge of fishing on to others. There are probably very few folks who learned to fish on their own. Like many, I learned from my dad, and I'm thankful he took time to teach me. Just as we were taught, we should make a concerted effort to teach others as well. This will not only ensure the persistence of this great pastime but also help protect the aquatic resources we share.

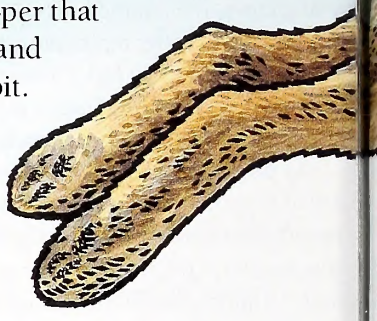
Kevin Hining is a fisheries biologist for the N.C. Wildlife Resources Commission. He covers District 7 in the northwest part of the state and lives in Moravian Falls.

Vanishing Rabbits

written by Buffy Silverman / illustrated by Consie Powell
nature activity by Anne M. Runyon

You stroll outside on a summer evening. As you near the garden, a fluff of white bounds away. Who is the white-tailed hopper that vanishes into the shrubs and bushes? A cottontail rabbit.

EASTERN COTTONTAIL



RABBITS IN THE WILD

Three types of rabbits make their home in North Carolina. The Eastern cottontail is the one you are most likely to see. It lives near people, munching on grass, clover and dandelions. In the evening or early morning, a cottontail might nibble in the garden, feasting on peas and beans. When winter arrives, the cottontail cannot find tender green plants. It shreds bark off shrubs and young trees, and gnaws on the wood underneath.

Those big ears are not just for listening. Rabbits have lots of blood vessels in their ears. During hot weather, blood flowing through these vessels is cooled by air and helps the rabbit stay cool.

It's harder to spot a marsh rabbit. The marsh rabbit makes its home in wet places in eastern North Carolina, preferring dense swamps. After dark, it hops through wetlands. There it chews on roots and stems of wetland plants. If a predator is on its trail, the marsh rabbit jumps in the water and swims to safety.

MARSH RABBIT

If you visit the mountains of western North Carolina, you might see the Appalachian cottontail. Closely related to an Eastern cottontail, this rabbit only lives in high places. It spends its days in mountain clearings, often hiding in thickets and shrubs. Look for one chewing grass along the side of a road or resting at the edge of the woods.

The rabbits you spy in woods, swamps, lawns or gardens differ from those sold in a pet store. Long ago, people began to breed rabbits in Europe and northern Africa to raise for food. Pet rabbits are the descendents of these species.

STAYING SAFE

Wild rabbits have many enemies. In the evening, raccoons, skunks and opossums prowl for a meal. Foxes, bobcats, snakes, weasels, owls and hawks hunt them, too. Dogs help human hunters find rabbits.

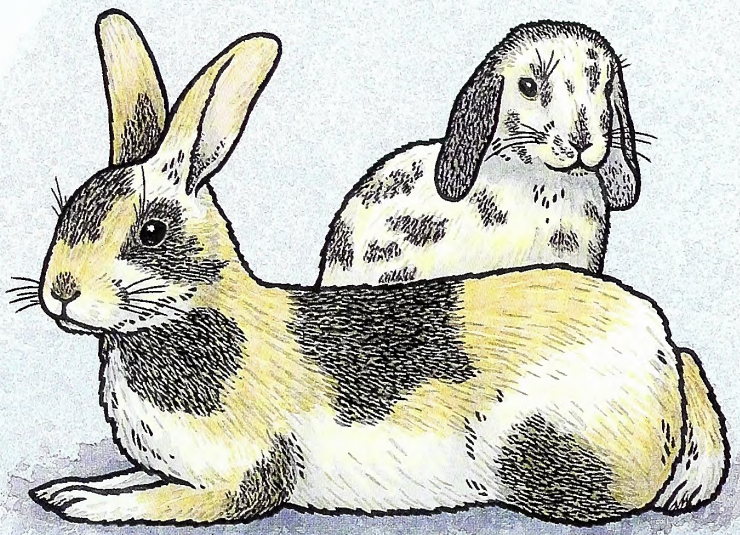
With so many predators about, rabbits must pay attention. Their long ears help them hear quiet sounds. Their big eyes look up, down and all around, noticing any movement.

What do rabbits do when a predator comes near? They sit motionless in thick bushes and shrubs. With their brown fur, they blend into their hiding places. If a dog or other animal comes sniffing, the rabbit bursts out and speeds away. Using strong hind legs, it can leap 15 feet in one bound. It slips in and out of shrubby spots, trying to escape. It might dive in a woodchuck burrow or a thick, low bush. Sometimes a predator loses the rabbit's trail. Often the predator wins the chase.

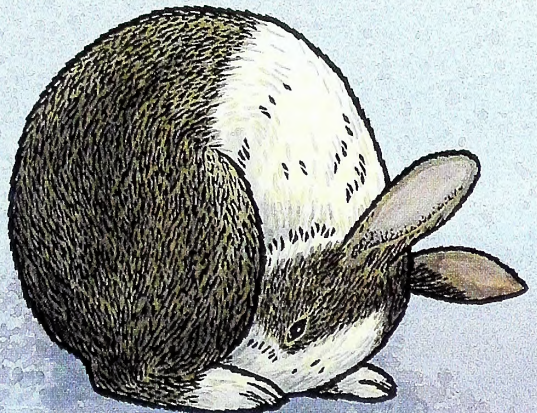
Although predators hunt many of them, there are always plenty of rabbits. A female rabbit can give birth to 40 kits in one year! But only four of the 40 will live to their first birthday. Most of the youngsters are eaten.

APPALACHIAN COTTONTAIL, grooming

Domestic rabbits are descendants of wild European rabbits. Those wild rabbits live in colonies in underground mazes of tunnels and burrows called warrens. North American rabbits do not live in warrens.



All rabbits digest the food they eat in two steps. After eating tender green plants, a rabbit produces soft, round pellets of half-digested food in its cecum, a special sac in its digestive tract. These pellets still contain lots of nourishment, so the rabbit ingests them again just as soon as it passes them. These pellets are not droppings, and consuming them is not optional. If rabbits don't eat them, they become malnourished. Actual rabbit droppings are dry and hard.



BABY RABBITS

Between February and September, rabbits give birth. A mother rabbit makes a nest for her kits. In tall grass or under a bush she scratches away dirt, leaving a shallow hole. Using grass, feathers and fur that she pulls off her belly, the rabbit lines the nest with a warm blanket. Here she gives birth to four or five kits.

At birth, the kits are scantily haired, blind and helpless. Their mother covers them with more grass and fur, hiding the nest. Then she hops away, spending the daylight hours resting in a bush nearby. In the evening, she returns. While she sits over the nest, the kits nurse. When they are done feeding, she slips off and searches for her own meal. She feeds her young three times during the night.

At 2 weeks of age, the youngsters are ready to leave the nest. They stay with their mother for another week, learning where to find food. They follow her as she nibbles on leaves and stems. When there is danger, they learn to hide. Hearing the sound of a sniffing dog or slithering snake, the young rabbits leap into shrubs and disappear.

A male rabbit is called a buck and a female is called a doe. But newborns aren't called fawns; they are called kits or kittens.

Get Outside

Do rabbits live in your backyard? You can attract rabbits by giving them what they need to survive. Like all animals, rabbits need food, water and a safe place to rest. Brush piles are great spots for rabbits to hide. In a corner of your yard or along the edge of the woods, build a brush pile. Arrange logs at the bottom of the pile, leaving spaces for animals to travel through. Then pile smaller branches on top. Let the grass near your pile grow tall. Rabbits may come for a nibble.

What should you do if you find kits? Leave them in the nest! Their mother has not abandoned them; she is probably watching them from under a shrub or bush. When evening comes, she will feed them.

Read and Find Out

- "Boxing Rabbits, Bellowing Alligators" by Stephen R. Swinburne, Millbrook Press, 2002.
- "Cottontails: Little Rabbits of Field and Forest" by Ron Fisher, National Geographic Children's Books, 1996.
- "Cottontail Rabbits" by Kristin Ellerbusch Gallagher, Lerner Publications, 2000.
- "Field Trips: Bug Hunting, Animal Tracking, Bird-watching, Shore Walking" by Jim Arnosky, HarperCollins, 2002.
- "Rabbits, Rabbits & More Rabbits" by Gail Gibbons, Holiday House, 2001.
- "Rabbits, Squirrels and Chipmunks" by Mel Boring, Northword Press, 1996.

In *Wildlife in North Carolina*:

- "Rabbits of North Carolina" by Lawrence S. Earley, April 1983.
- "New Breed of Bunny" by Carl Betsill, August 1985.
- "Rabbits on Line" by Edward Lunk, November 1989.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Disappearing Rabbit Mandala

When the hungry fox pounces, the cottontail rabbit will leap away to hide under a tangle of blackberry and tall grasses, but the marsh rabbit swims into the swamp to hide among the cattails and spatterdock.

1) Cut out the box.
2) Fold the box in half twice, with the rabbit design on top.
3) Carefully cut away the dark areas.
4) Now gently unfold your rabbit mandala.

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Day at the Docks Celebrates Hatteras Watermen

ERNIE FOSTER

Day at the Docks, a celebration of Hatteras watermen, had its beginnings amid the destruction of Hurricane Isabel in 2003. It should have come as no surprise that when the inaugural Day at the Docks last year was threatened by Hurricane Ophelia, the Hatteras villagers waited out the storm, and then proceeded with the celebration.

"After Hurricane Isabel, the night before Highway 12 reopened, we had a special musical program at our church," said Lynne Foster of Hatteras. "It was such a nice celebration of the village tradition and spirit that we decided to do it again the next year."

On Sept. 18, 2003, Isabel had cut a new inlet just above the village, isolating the town. It took two more months for the inlet to be closed and N.C. 12 to be rebuilt.

Following the 2004 celebration, the villagers decided to focus more on honoring the centuries-old traditions of the island's watermen. "We thought there was really nothing dedicated to the watermen," said Foster, the wife of Capt. Ernie Foster of the Albatross Fleet. Capt. Ernal Foster, Ernie's father, pioneered the offshore charter-boat industry in Hatteras in the late 1930s.

With assistance from N.C. Sea Grant and the Outer Banks Visitors Bureau and a large community effort, organizers chose Sept. 17 as the date of the first festival. Unfortunately, Hurricane Ophelia was lurking in the Atlantic for much of the week before battering the coast on the 14th and 15th. The storm delayed the start of Day at the Docks a bit, but did not postpone it. "When you make a living on the water, you learn to be flexible and willing to improvise," Ernie Foster said at the time.

It is that spirit and the heritage of Hatteras watermen that Day at the Docks seeks to honor and reveal. At this year's celebration on Sept. 16 from 10 a.m. to 5 p.m., visitors have opportunities to meet and talk to commercial fishermen and charter-boat captains, see their boats, try their hands at net mending and learn to fillet fish. They also may watch fishermen compete in contests that measure their skills, such as the concrete marlin contest, in which plastic buckets are filled with concrete and lowered into the water for anglers to haul to the surface with rod and reel to be gaffed.

North Carolina watermen face an uncertain future. A maze of regulations, plus fishery closures and competition from imported seafood, have driven the number of active commercial fishermen in the state to just under 4,000. North Carolina's commercial harvest in 2005 was its lowest ever. "At this point, the watermen's heritage is still a living heritage," Lynne Foster said. "The celebration has helped us gain some public interest in the things we're fighting for. We are losing watermen and fish houses at a rapid rate. We think that when visitors see these watermen, they will realize they are people worthy of concern."

LYNNE FOSTER

Spring Turkey Harvest Biggest Ever

North Carolina's spring wild turkey season was the most successful on record, with hunters bagging 11,706 birds. It was the first time Tar Heel hunters surpassed the 10,000-bird mark. The previous high was 9,862 in 2003, and the 2005 harvest was only slightly lower at 9,824.

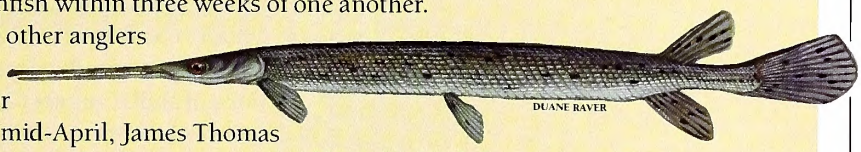
Although there were fewer jakes in the harvest this year because of a poor hatch and poult survival in 2005, hunters found plenty of 2-year-old gobblers from the very good 2004 hatch. Jakes (yearling gobblers) comprised only 13 percent of the harvest. Because the 2006 hatch was one of the poorest on record, there will be far fewer 2-year-olds available and the overall harvest likely will decline next year.

Not surprisingly, the northern tier of counties had the biggest harvests. Caswell led the state with 399 birds, followed by Halifax with 366 and Granville with 362. Seven counties had harvests of more than 300 birds.

North Carolina's youth turkey hunt, held the Saturday prior to the regular-season opener for children under 16, also proved very popular. Young hunters killed 312 birds—241 adult gobblers and 71 jakes. The 2007 youth hunt is April 7, the Saturday before the statewide season begins.

Pair of Fishing Records Fall

Two North Carolina anglers reeled in state-record catches for longnose gar and green sunfish within three weeks of one another.

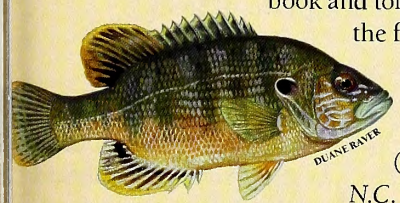


Like many other anglers fishing the Roanoke River at Weldon in mid-April, James Thomas Bryant was hoping to land a monster striped bass. He landed a monster all right, but not the striped kind. After only 30 minutes fishing on April 16 off the rocks near the boat ramp, the Henderson angler caught in a longnose gar that weighed 19 pounds, 8 ounces and measured 51 3/4 inches in length using a green bucktail lure.

"I had no clue that it was a state record," Bryant said. "I thought the state record was much bigger. I was pretty excited to find out it was a state record." Bryant's catch surpassed the previous longnose gar state record by 4 ounces. That record had been held by Joseph M. Mobley of Wallace since May 15, 2002.

John Michael Deaton of Rougemont landed his record green sunfish while fishing on a pond at Falls of Neuse/Butner Game Land on May 5. Deaton caught the 1-pound, 2-ounce fish using a live red worm as bait.

Around 11 p.m., Deaton landed the 11-inch fish, and suspected right away that he had a new state record dangling from the end of his hook. He called his granddad, Sam Wiseman, to find out the size of the current state record. "He looked in the regulations book and told me the state record was 8 ounces, and I knew that the fish I had caught was bigger than that," Deaton said.



The previous green sunfish state record, held by 12-year-old Robert Womack of Benson since May 18, 2005, tipped the scales at 15 ounces. (Womack's fish was caught after the *2005–2006 N.C. Inland Fishing, Hunting and Trapping Regulations Digest* went to print. The state record before that was an 8-ounce sunfish held by Gibsonville angler Craig Wyrick since Sept. 16, 1998.)

To qualify for a state record, anglers must have caught the fish on a hook and line, must have the fish weighed on a certified scale witnessed by one observer, have the fish positively identified by a qualified expert from the N.C. Wildlife Resources Commission and submit an application with a full, side-view photo of the fish.

For a list of all freshwater fish state records in North Carolina, visit ncwildlife.org. For more information on fishing in North Carolina's public, inland waters, call the commission's Division of Inland Fisheries, (919) 707-0220.

IN SEASON

This month, these seasons are open in North Carolina:

Canada Goose: Sept. 1–30.

Crow: Wednesday, Friday and Saturday of each week between June 1, 2006, and Feb. 28, 2007, plus Labor Day, Thanksgiving and Christmas.

White-tailed Deer: Eastern, Central and Northwestern bow and arrow seasons open on Sept. 9. Western bow season begins on Sept. 11.

Mourning Dove: Sept. 2–Oct. 7

Rails, Gallinule and Moorhen: Sept. 1–Nov. 9.

Teal: Sept. 14–23 (East of U.S. 17 only).

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria, except that nutria may not be shot in Currituck County during open seasons for migratory waterfowl. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2006–2007 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit our Web site, www.ncwildlife.org.

Corps of Engineers Targets Obsolete Cape Fear Dams

The removal of three obsolete dams along the Cape Fear River could improve recreational and commercial fisheries for striped bass, American shad and hickory shad, and help tremendously in restoration efforts for river herring, Atlantic sturgeon and shortnose sturgeon.

The demolition of locks and dams No. 1, No. 2 and No. 3 would restore very important spawning and nursery habitat for these migratory fish in the river, and increases in their populations would likely result, according to the N.C. Wildlife Resources Commission, N.C. Division of Marine Fisheries, U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

NCWRC

The U.S. Army Corps of Engineers owns and operates locks and dams No. 1, No. 2 and No. 3 on the Cape Fear River, and these structures are no longer used for navigation, which was their intended purpose. The corps is interested in "decommissioning" the dams and is studying their options as part of a General Reevaluation Report for the Wilmington Harbor Deepening Project.

Although the Cape Fear River locks and dams were not designed for water supply, Wilmington, Fayetteville and other local users depend on impounded waters behind these dams for their water supply source. The fishery agencies are committed to working in partnership with these water users and other agencies to find water supply solutions that will satisfy municipal water needs before any of the three Cape Fear River locks and dams are removed.

State and federal fishery agencies promoting removal of these dams are eager to work collaboratively with municipalities and citizen groups to restore fisheries habitat in North Carolina's coastal rivers.

If recovery of the striped bass, American shad and hickory shad populations happened as predicted, recreational and commercial fisheries for these fish would improve. Coastal marine fisheries would benefit also because juvenile shad and herring spawned in fresh waters migrate downstream to the ocean and provide an important prey base for other popular fish species, such as red drum, flounder, bluefish and seatrout.

ON PATROL

Wildlife officer Steve Barnett received a complaint from a duck hunter that while hunting on the Trent River, a man had driven his boat into the hunter's decoys and had thrown a bucket of corn into the spread. The man then explained to the hunter that this area was baited, and he had already called the game warden. The hunter and his two young sons left the area and notified Officer Barnett.

ILLUSTRATED BY JACKIE PITTMAN

Officer Barnett and Lt. Richard Venable returned to the scene of the harassment disguised as duck hunters. Soon two male subjects came across the river in a boat and approached the officers. The subjects told the officers, who were anchored in public waters, that they were trespassing and that the area was baited. The subjects motored up to within 5 yards of the disguised officers.

Venable asked the men to leave so that they could continue their hunt. One of the men replied that he was going to stay right there and observe the sunset. Venable asked, "So you are going to interfere with our hunt?"

"Yes sir," was the reply. After a few more minutes of conversation, the officers radioed for Officer Steve Long to come to their location. Both subjects were charged with hunter harassment.

CALENDAR OF EVENTS

Friday–Sunday, Sept. 8–17

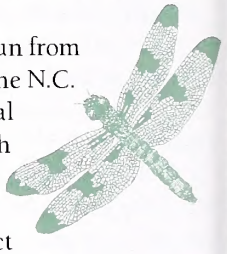
Check out the livestock exhibits, midway rides, entertainment and the N.C. Wildlife Resources Commission's exhibit, including the Mobile Aquarium and Sensory Safari Trailer, at the N.C. Mountain State Fair in Fletcher. Visit ncagr.com/markets/fairs/mtnfair or call (828) 687-1414.

Saturday–Sunday, Sept. 9–10

View antique and classic boats at the Antique and Classic Boat Show on Lake Norman near Charlotte. Visit charlotteantiqueboatshow.com.

Saturday, Sept. 16

Explore Hatteras Island's fishing traditions and the world of working watermen during Day at the Docks in Hatteras Village. Local watermen will participate in competitions, displays and exhibitions of skill. Contact (252) 986-2515.



Join the BugFest fun from 9 a.m.–9 p.m. at the N.C. Museum of Natural Sciences in Raleigh with exhibits, activities and presentations. Contact 1-877-462-8724 or visit bugfest.org.

Friday–Sunday, Sept. 22–24

Enjoy a tasty spot dinner, plus other food, and view a variety of arts and crafts at the N.C. Spot Festival in Hampstead. Check out visitpender.com or call 1-888-576-4756.

Friday–Saturday, Sept. 29–30

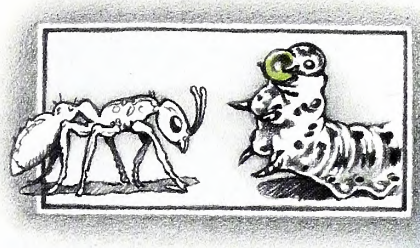
Learn about trapping at the N.C. Trappers Rendezvous at the Johnston County Livestock Arena in Smithfield. An archery contest, live snakes, food and games for children are among other attractions. Visit ces.ncsu.edu/johnston or call (919) 934-8434.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

How Do "Unarmed" Caterpillars Defend Themselves Against Predators?

written by Clyde Sorenson
illustrated by Jim Brown

CATERPILLARS ARE ESSENTIALLY slow-moving bags of fat and protein, ripe for the picking by observant predators. But, even without poisonous spines, they have many ways to avoid becoming someone's lunch — here's just a sampling.



Red-headed sawfly larvae (not true caterpillars but rather "honorary" caterpillars that metamorphose into primitive wasps) store the sticky resin from their pine needle diet in part of their gut. When a predator such as an ant attacks, the larva rears back and flings a gummy, toxic wad at the enemy, entangling and potentially killing it. Red-headed sawflies feed together so they can muster a mass counterattack.

Many inchworm caterpillars are dead ringers for tree twigs, complete with fake leaf scars and buds. When it perceives a potential predator, the inchworm slowly straightens, "becoming" an inedible bit of wood.

Sawfly Larvae

Inchworm Caterpillar

Immature Spicebush Swallowtail Caterpillar

Young spicebush swallowtails are colored to look like the last thing a bird might want to eat — bird droppings. Mature spicebush caterpillars have two large eye spots, making them look much more like a small, green, potentially dangerous snake.

Monarch Caterpillar

Mature Spicebush Swallowtail Caterpillar

Many caterpillars, including this monarch, sock away the poisons they harvest from host plants in their bodies. Bright colors warn predators that eating them could be dangerous.

Growing Up on a Pier

written by Jim Dean

There wasn't a lot of traffic in 1959 on the narrow strip of asphalt that ran along the western arc of Bogue Banks beyond Salter Path. Only curious adventurers and fishermen drove the barren and pot-holed half dozen miles or so to the Emerald Isle Pier. Just past the pier, the deteriorating pavement took a sharp dogleg to the left then ran behind the high oceanfront dunes for another 2 miles before it simply ended. The rest of the island all the way to Bogue Inlet was a desolate stretch of beach, dunes and maritime forest—no cottages, no ferry, no bridge, no Bogue Inlet Pier and certainly no ubiquitous Wings hawking flip-flops, rubber sharks and T-shirts. Oceanfront lots went unsold—$3,000 each; take your pick—because memories of Hurricane Hazel's destruction in 1954 were still fresh. After the road was extended to the newly built Bogue Inlet Pier later in the 1960s, and ferry service was established, scattered cottages began to appear, but for roughly 20 years until the Route 58 bridge across Bogue Sound was completed, that end of the island remained largely untouched.

JIM DEAN

Emerald Isle Pier circa 1972

"Our days unfurled predictably, tied to the slow wheel of the seasons."

I was still in school in the early '60s, and it was my good fortune to spend large chunks of summer vacation at Emerald Isle. I walked miles down the beach past the end of the road, exploring swales and dunes that ran back into the forest, bringing back shells, sand-glazed bottles and driftwood. Human footprints or litter were virtually nonexistent.

We occasionally fished the inlet, bleeding air out of the tires and driving on the beach where we seldom encountered other surf fishermen. Most of my time was spent on Earl Thompson's Emerald Isle Pier. Day after day, I would arrive on the pier before daylight, eat a fried egg and bacon sandwich, and fish until past dark. Time was measured only by the tides, and after a week or so I couldn't have told you whether it was still June, or possibly, early August.

Within a few years, Earl sold out to Ken Heverly and his family, and the pier's rusty steel pilings were replaced with wood. Though I was teenager, I was accepted among the highly skilled, and much older, men and women I came to admire. Some were military out of Lejeune or Cherry Point, but many were from rural eastern North Carolina. Master Sergeant Pete Leo, Elmer Bland, Mal Boyette, Ralph Carter and El and Rachel Tavasso and their kids were part of a large pier family that seemed to spend every non-working moment fishing. Like them, I free-floated live baits for kings, cobia and tarpon, plugged for blues and Spanish mackerel, drifted popeye mullet minnows for flounders and soaked bait for a variety of bottom fish—whatever offered the best opportunity.

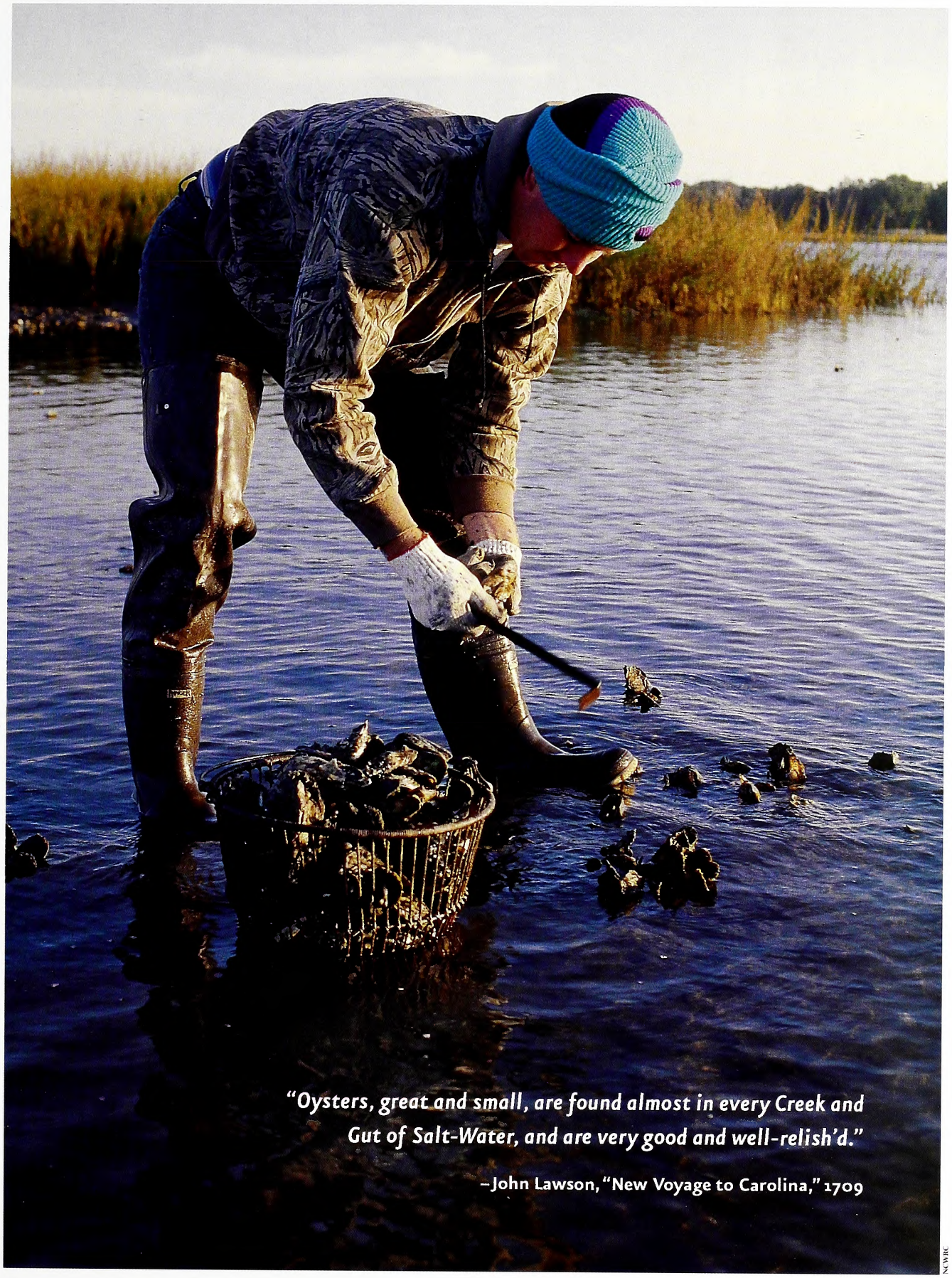
Our days unfurled predictably, tied to the slow wheel of the seasons. Mostly, we sat on the end in dazzling sunshine above the green sea and the gently heaving pilings, but we pretty much stuck with it, even fishing through summer showers. Some diehards rolled out sleeping bags and slept on the pier. Occasionally, we'd get someone to watch our live baits while we went to the pier house for a drink and a Nutty Buddy. Pier fishing, like combat, tends to consist of hours or days of boredom punctuated by moments of raw excitement.

Yet, while fishing a pier is a simple matter of "chunk and hope" for many, it can also be incredibly complex. A dozen or more commonly caught species each demand special tackle and tactics, both further dictated by weather, tides, time of day and season. Often, the smallest detail can make the difference between success and failure, and good pier fishermen often equip a specially built cart with half a dozen or more rods, several tackle boxes, a cooler or two, a cast net, an aerated live-bait tank and a large live-bait container that can be lowered into the water. To land the bigger fish, you need a circular landing net or flying gaff that can reach the water, or be prepared to walk your trophy to the surf. Small wonder that many experienced pier fishermen have little desire to go offshore and troll, even those who can afford it. They don't find it as challenging.

Pier fishing, however, is in trouble. In the June 2006 issue of this magazine, author Bill Morris and photographer Scott Taylor detailed the uncertain future facing piers. Soaring land values are the biggest threat, but the Emerald Isle Pier and others were damaged by hurricanes and dismantled.

Like his dad, my son, Scott, grew up on the Emerald Isle Pier. I thought I would never see him any sadder than the day he hooked a big king on a plug, only to lose it under the pilings.

But that was before we stood silently on the beach together staring at the vacant ocean where that pier had once stood.



NCVRC

OUTDOOR MOMENT

Brunswick County oystering

IN THE OCTOBER ISSUE

MARK JOYNER

FALL FUNGI

Jack-o'-lanterns and devil's eggs are a couple of the colorful names given to North Carolina mushrooms that appear in autumn.

SALTY NEW ERA

Marine fisheries data will improve greatly once the Coastal Recreational Fishing License comes into effect in 2007.

50 YEARS AGO

In the era before deer restoration, the opening of hunting season in Pisgah National Forest was something special.

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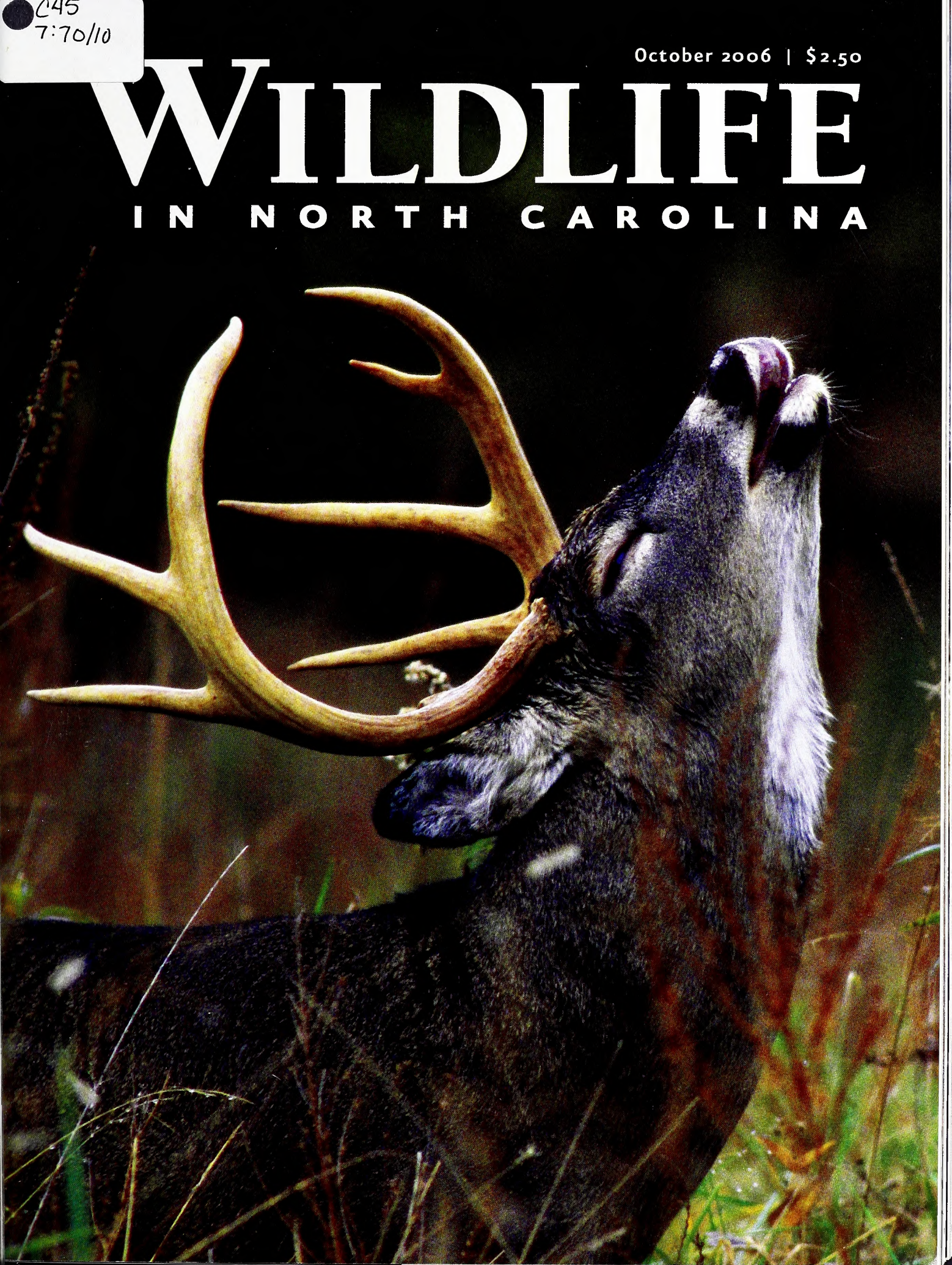
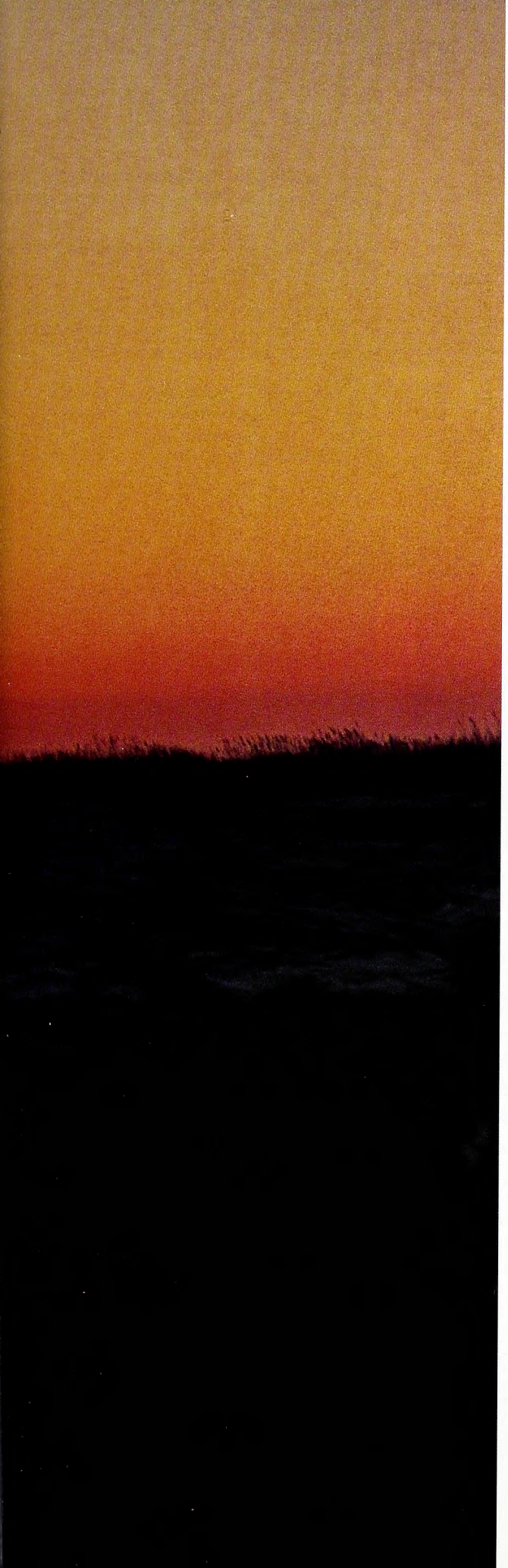
IN NORTH CAROLINA



This will be the last autumn that surf fishing on the North Carolina coast will be free. To find out why this is a good thing, see our story on page 20.
PHOTOGRAPH BY F. EUGENE HESTER.



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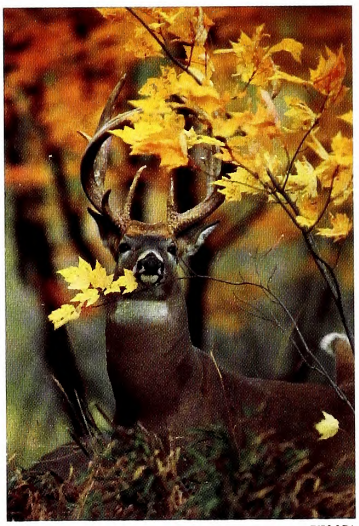
Cover: As October cools, deer mating heats up. Our cover buck exhibits flehmen behavior, his way of detecting nearby does in heat. PHOTOGRAPH BY BILL LEA.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

For many North Carolinians, the words "deer" and "October" immediately bring to mind the thought of whitetails running rampant. Depending on your point of view, this notion is either terrifying or exhilarating. If you are driving your Civic long distances on U.S. 64 at night during October, you are probably apprehensive. It's inevitable that those glowing eyes will appear in or near the roadway. Amped up on hormones, whitetails turn their attention to love instead of being hypervigilant for danger. So if you are gathering your bowhunting equipment or doing some late scouting for gun season, you are probably as giddy as a child at a carnival.



BILL LEA

Everybody in the state has had some type of experience with deer. Try to think of another large mammal species that everyone you know has seen in the wild. Whitetails are basically giant gray squirrels minus the chattering. Love them or hate them, deer are here to stay. And although that has been true for decades, we still have not figured out how to coexist with these interesting creatures.

We build homes on their habitat; they eat our landscaping. We widen roads through prime deer country; they attempt, sometimes in vain, to cross those motorways. We feed them corn in our backyards; they come back again and again like domestic pets. We hunt them for meat, trophies or to thin out their numbers; they keep reproducing and making more deer.

What can we do to make our lives with deer easier? Learn to enjoy venison the way author Scott Belan does ("What About the Venison?" page 10)—with great recipes also available at our Web site, www.ncwildlife.org. And to guarantee that you always have a supply of venison available, start harvesting deer yourself. It will pay dividends in several ways: Having a few less deer around might save your azaleas and hostas, or perhaps allow you avoid a trip to the auto body shop. And did I mention that hunting allows you to spend lots of time outdoors? Perhaps this October will be more thrilling than chilling.

Greg Jenkins

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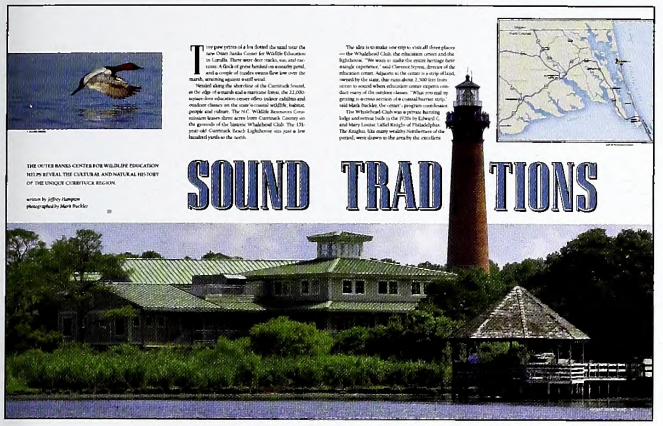

Canoe Questions

I thoroughly enjoyed Jeff Hampton's article on the Outer Banks Center for Wildlife Education ("Sound Traditions," Aug. 2006). I would, however, like to correct one possible misconception from the "At A Glance" section. The dugout canoe on display is a historic rather than a prehistoric log boat. On close inspection it can be seen that axe marks are present that indicate the builder was using iron tools to shape the boat. Prehistoric Indian canoes were shaped by burning and then scraping the charred wood to the intended configuration.

Another clue is the use of augered holes to gage the bottom thickness of the boat. This was to insure that the builder did not cut completely through the hull, and thus ruin it, during the hollowing process. The outer hull was shaped first, and the holes were drilled to the depth of the intended thickness of the hull. The builder hollowed the canoe with an adze, and as the holes were encountered he knew that the final thickness of the hull had been reached. Afterwards the holes were doweled to make the boat watertight. This technique was never used by prehistoric Indians.

The final clue that this was a historic period canoe is the design. Though it is difficult to visualize with the badly deteriorated hull, the overall shape was more like that of a miniature periauger, and may even have had a wineglass-shaped stern. Indian canoes typically looked like what they were: hollowed-out logs. Certainly we can never determine the builder's race, but we can be certain that he had iron tools and a European concept as to how a boat should look.

Nathan Henry
Assistant State Archaeologist
and Conservator
N.C. Office of State Archaeology
Kure Beach

Edge of the Pond

I read the article "From Pound to Pond" in your August edition and can relate to almost every aspect of the author's frustration with training a "duck dog." Can you provide a list of published resources the author used to assist him in the training techniques? The article mentioned some books, but never gave the titles. Your readers would love this information to help us with our own "pond puppy."

Larry W. Mitchell
Raleigh

Jonathan Hewitt: The sources used were a marinade of many different flavors. The videos were from Tri-Tronics, the books were "Gun Dog" and "15 Minutes to a Great Dog," and I used Gun Dog magazine and several random magazine articles from ducks.org. Many of the techniques used had to be modified from their original form. Because of my mistakes, I will do many things differently next time around.

Skunks and Hawks

I have lived in the following counties: Wayne, Wilson, Gaston, Watauga, Wake, Beaufort, Lincoln and Catawba, in that order. Until I came to Catawba County 31 years ago at age 36, I had never seen a skunk, and I don't think I had smelled one either. Catawba County is full of skunks. We seem to have more dead skunks on the highways than opossums. Most are seen in early spring. What are the statistics on skunk populations throughout North Carolina?

When I was growing up in Wayne County there were lots of sparrow hawks. I used to catch them in tobacco barns. I never hear of them any more. Recently I purchased the National Geographic book on birds and the sparrow hawk was not mentioned. What's the story on them?

W.A. Ethridge
Newton

Striped skunks are found across the Piedmont and Mountain regions of North Carolina and a few coastal counties, but are mostly absent from the southern Sandhills and the central Coastal Plain. Catawba County is part of the skunk's main range in the state, which extends in a band through the foothills and northern mountains from Gaston and Rutherford counties north to Ashe and Stokes counties.

"Sparrow hawk" is the former name of the American kestrel, Falco sparverius, a small falcon species found across North Carolina. Kestrels are most commonly found in open areas, where they prefer to hunt. One well-known beach town in North Carolina is named after another of the kestrel's nicknames, kitty hawk.

Milkweed Moments

Julie Dunlap, Patricia Savage and Anne Runyon struck a chord in me with their lovely coverage of the Asclepias life cycle ("A Milkweed Year," Wild Notebook, Aug. 2006). On my trip to Yancey County in late June, there was common milkweed along the driveway and in our meadows, but mostly still just in bud. The day one actually burst to flower, the spangled fritillaries and skippers were so thick on it you could hardly see the soft purple bloom.

One day, having walked to our ridge top, I thrilled to see tall milkweed — at least 6 feet high — in a colony sporting spicebush and tiger swallowtail butterflies on its droopy, whitish fluorescence.

As an artist, I loved Ms. Savage's pen work and natural colors, for to me she accurately portrayed the dynamic of the micro-milkweed world. Not being a hunter, I treasure your nature pieces — and those about conservation lands — the most.

Rebecca Eagan
Winter Park, Fla.

write us

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PISGAH FOREST'S Good Old Days

A Look at Deer Hunting in Western North Carolina 50 Years Ago

written by John Oberheu • illustrated by Tim Lee

Driving down the gravel road leading to the North Mills check station, I could have been arriving at a county fair. Cars were parked haphazardly everywhere. People walked the road or stood talking in small groups. Nearing the refuge manager's house, I saw a lineup of cars that began at a small check station about 100 yards beyond the dwelling. When I parked and started looking for the manager, I could sense a feverish excitement in the crowd.

That was 50 years ago on a Sunday afternoon in November. Only three months out of college, I was the N.C. Wildlife Resources Commission's newest wildlife biologist, and it was my first experience working a managed deer hunt. Each of the commission's nine biologists had been assigned to one of the state's most active hunt locations to monitor the condition of the deer. Mine was North Mills Station, known to have one of the best hunts in the state.

I had been driving all day from my home in Kinston and was looking for my contact person, refuge manager Wayne Wiggins. Pisgah was more a wildlife management area than a "refuge," but in those days it was called a refuge.

Wayne was one of the Wildlife Commission's senior managers and had worked on Pisgah for over 16 years. I had never met him in person but knew he was experienced and well respected. I had called him several weeks earlier to introduce myself and ask for help in finding lodging. He promised to reserve a bed for me at the home of the Whitakers, a nearby farm family that boarded deer hunters. I needed directions to their home and instructions on what he expected of me the next morning.

I found Wayne surrounded by eager hunters, each trying to get his attention. Some who knew him were hoping for a tip on where to hunt; others wanted to know about hunt rules. Amid all the activity, Wayne was doing his best to finish last-minute preparations for checking in hundreds of hunters at 4:30 the next morning.

I soon learned that opening day of deer hunts was the most important day of the year at Pisgah Forest for local hunters as well as many from Asheville, Gastonia, Charlotte and even other states. North Mills was the favorite of five check stations on Pisgah because it usually had the best success rate. Most hunters were regulars who came every year and wouldn't think of going anywhere else.

During the evening meal at the Whitakers' I met longtime hunters from Charlotte and northern Ohio. At 4 the next morning, we were served a hearty country breakfast and given our bag lunch. As I ate and listened to the hunters talking about previous hunts and their plans for the day, I began to catch their fever.

Thirty minutes later I found a crowd of hunters gathered at the check station. They milled around in the dimness of a single yard light, talking excitedly while they waited for check-in.

We warmed ourselves around the stove and sipped coffee while checking in a few stragglers. As dawn began to break, we walked outside to enjoy the clear, frosty morning.

An Early Start. Soon the check station window opened, and we began to issue permits to hundreds of hunters lined up in their cars. They paid a $3.50 fee, chose a hunt compartment (zone) and left their hunting licenses. Each received a permit that was to be pinned on his back. Hunting licenses were filed separately by compartment to provide a fast and easy record of each hunter's identity and hunt location. Holding the licenses also ensured that each hunter would check out.

The refuge staff and hired helpers quickly developed a smooth routine, which kept the line of cars moving briskly. As soon as car occupants had their permits, they hustled away to stake out their stands and get settled before daylight. Since there were only a few graveled roads through the 30,000 acres of rugged mountains, hunters needed time to spread out and find their stands in the dark.

We had all waiting hunters checked in 30 minutes before daylight. When the last car left, things really slowed down. We warmed ourselves around the stove and sipped coffee while checking in a few stragglers. As dawn began to break, we walked outside to enjoy the clear, frosty morning. The smell of wood smoke from the check station brought back nostalgic memories of my childhood.

Wayne's son Johnny split stove wood from sawed sections of a large log. The wood came from big native chestnut trees killed years before by blight. The few dead snags still standing on some of the more remote parts of the forest made ideal firewood. It was solid, straight and easy to split.

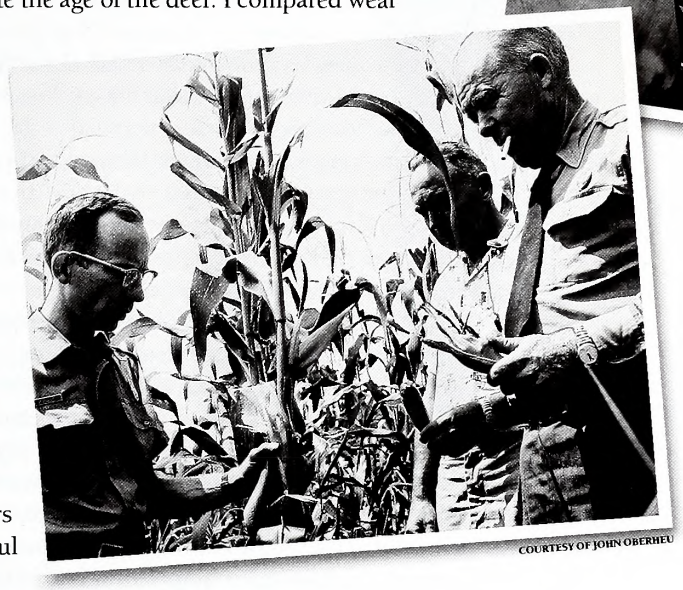
Suddenly the stillness of the morning was shattered by the sharp crack of the first rifle shot. It resounded through the crisp mountain air and echoed from mountain peak to mountain peak, gradually diminishing for several seconds until finally fading into silence. One of the most striking sounds I had ever heard,

it was new and exciting to me. For the men who managed and protected the deer all year it was old hat, but it was still exciting. It signaled the start of a deer harvest that had been one year in the making. Hunts were the payoff for their year's work of protecting and nurturing the deer. I would experience that magic sound many times in the years that followed, and it never failed to thrill me.

As the sun rose above the nearest mountain peak, its brilliant beams finally reached into the valley to touch the check station. The first successful hunters brought in their kills, and I started learning how to process them. I weighed each one and then measured its antlers and its left hind foot. I used a device called a jawbreaker to pry open its mouth so I could look at its jaw teeth. Wear on the teeth allowed me to estimate the age of the deer. I compared wear to my "jaw board," which displayed lower jaws from known-age deer, from 6 months through 10 years old. The data I recorded were used to monitor the health of the deer herd.

Before my first day was done, I had checked about 30 deer, all of them antlered bucks. With a total of around 450 hunters, the 30-deer harvest gave a ratio of about one for every 15 hunters, a very good success rate. The season average for western North Carolina was usually about 25 hunter days for each deer harvested, but hunters were almost always most successful on opening day.

COURTESY OF JOHN OBERHEU



COURTESY OF JOHN OBERHEU

The author (at far left), Pisgah refuge manager Wayne Wiggins (far right) and an unidentified man check the quality of a wildlife food plot of corn. Above, hunters wait in line at Pisgah for their hunt permits.

About half the hunters had checked out before dusk. Some of the others hunted until it was too dark to see and made kills late in the day. My busiest time was from dusk till dark, and I hurried to finish checking the deer of waiting hunters anxious to get home. After dark I had to have someone hold a flashlight so I could read my tape and peer into a deer's mouth. An hour after dark, all but a few stragglers had checked out, but I was still working on the last kills.

At 8 p.m., two cars still had not checked out. Assuming they were lost or having car trouble, the hunt patrols went to find them. Though tired and hungry, none of us could leave until the last hunters were out. We knew who they were from their hunt licenses, and approximately where they hunted from the hunt compartment they had chosen. Searchers drove the roads, stopping and firing a gun until they heard a voice, saw a light or got a responding shot from the hunter's gun. It was after 9 p.m. before we could locate the hunters, close up and go for our dinners.

New Hunter Safety Concerns. During my second deer season at North Mills, we had a fatal hunting accident. It was an hour after the accident before the man was brought to the check station. He was still alive and lying in the backseat of a car. When rescuers were told an ambulance had been dispatched from Asheville, they rushed to meet it. The man's wound was thought to be in his lower abdomen, but no one had bothered to check it or stop the bleeding. It was actually in his upper thigh, and a tourniquet might have saved his life. Unfortunately, he bled to death before reaching the hospital.

This accident raised statewide concern about hunter safety and overcrowding. A new policy required deer hunters all over the state to wear a large patch of red or orange on both the front and back of their jackets. We also made more of an effort to spread hunters and avoid overcrowding. Limits were set for each hunt compartment at North Mills. When favorites were filled, hunters had to choose less crowded ones.

During my third deer season at North Mills, I worked the first hunt for antlerless deer since a 1927 law made it illegal to kill does in North Carolina. Biologists had tried for several years to convince lawmakers that the law was outdated. Some locations in the state had more deer than the habitat could support. Since one buck can breed several does, deer numbers

had steadily increased without any checks. Gone were the animals' only natural predators, the Eastern cougar and the red wolf. Free-running dogs and poaching, the only threats to growing deer herds, were watched for and controlled on wildlife management areas.

At Pisgah Forest, there were clear signs of too many deer. A distinct "browse line" showed where the whitetails had trimmed all the edible forest plants to the highest level they could reach. This open, parklike look was everywhere, excepting the forest edges where dogs kept deer in check. In places where logging was done, new trees couldn't grow back because deer kept seedlings nibbled to the ground.

Deer were showing signs of starvation and stunted growth. There wasn't enough food. When the best food plants were gone, the deer had to eat plants that were less healthy or even toxic for them. Once the habitat is damaged this much, it takes years to recover, even if the deer population is greatly reduced.

Biologists knew the deer herds had to be reduced, and that hunting only bucks could not do it. But they had to convince hunters that taking does would help rather than ruin their hunting. The Wildlife Commission finally persuaded the General Assembly to change the buck law, but hunters were wary. Many of them would come to the regulation meetings to fight any kind of doe season.

Biologists knew the deer herds had to be reduced, and that hunting only bucks could not do it. But they had to convince hunters that taking does would help rather than ruin their hunting.

The first antlerless hunts were planned with great care. Only one or two days were scheduled. No one knew how many hunters to expect or how many deer they might kill. It was feared that crowding of hunters might cause shooting accidents. The Wildlife Commission did not want to set hunter quotas, because that might require either a lottery system or turning hunters away. Instead, a unique system of controlling the number of hunters was tried.

Because opening day of deer hunts almost always had the highest success rate, it also had the most hunters and thus the greatest accident hazard. Someone thought of reducing the hunt hours on the first hunt days to make them less attractive. Most hunters believe the best hunting is at daybreak, so it was hoped that delaying starting times would cause fewer hunters to show.

The first antlerless hunt day started at 2 p.m. This provided only four hours of hunting before dark. The second day of the two-day season started at noon. As crazy as this might sound, it worked very well for spreading the number of hunters over the two days. In following years, when more days were added, the delayed starting times were relaxed but still used effectively. The hunters hated them.

A second safeguard for hunter safety was restricting the hunts to antlerless deer only. Shooting a deer with visible antlers was a violation. This made it necessary for hunters to look carefully at each deer before shooting, because spike bucks can be mistaken for does. This made accidental shooting of hunters less likely.

Reducing the Herd. Though it served its purpose, the antlerless rule also made a problem for law enforcement. When a spike buck's antlers were just budding but not yet through the skin, should they be considered visible? Budding antlers can be very short and difficult to see at a distance. It was decided that spike bucks would be considered antlerless until their antlers broke through the skin.

Antlerless deer had never been subjected to hunting, and Wayne watched the hunt with concern. A lot of hunters were worried. Would it be so easy to kill does and fawns that future hunts would suffer? "A lot of our regular hunters didn't show today because they figure it's not sporting to kill does," Wayne confided. "Some of them will

never, ever kill anything but a buck." His statement would prove prophetic, as biologists worked for years to overcome the bucks-only prejudice.

As expected, success on the antlerless hunts was very high. On that first day at North Mills, one of every six hunters was successful. I checked out more than 100 deer. During the days following the hunt, refuge managers watched anxiously to see how many deer were left. Gradually, they were reassured. There were still plenty of deer.

Though these first antlerless hunts were useful for harvesting more deer, they did not reduce the herd as much as needed. When biologists tried to increase the hunt days the next year, there was stiff opposition. The bucks-only hunting ethic had been oversold. It had become so ingrained that most hunters could not accept any additional doe harvest. For two years, they blocked any expanded season.

Damage to native vegetation worsened, and the health of the deer declined. A turning point finally came when there was a massive die-off on the Daniel Boone Wildlife Management Area. Frank Hayes of the Southeastern Wildlife Disease Study in Athens, Ga., was called in to find the cause.

When Hayes and his team completed their work, they set up a news conference to present their findings. You could hear a pin drop in the audience as Hayes made his report. He showed slides of the many different parasites found in dead deer. He described them as villains who were stealing deer from the hunters. He skillfully showed how the starved condition of the herd caused their weakened condition, and this in turn allowed parasites to increase. More deer had died than the hunters had harvested.

That convinced the hunters of the need to kill more does. Die-offs on Mount Mitchell, Fires Creek and other management areas also helped prove that doe hunting was needed. When the next year's hunt proposals included a four-day antlerless season, hunters wanted to know if it was enough to turn things around.

After several antlerless seasons, hunters were reassured. They found that hunting actually improved. More deer were harvested, and hunters discovered that does and young deer did not have the strong taste of bucks. As herds came more in balance with their habitat, weights and antler sizes increased. Eventually, antlerless hunts changed to either-sex hunts, and the deer population came under control. The severe browse lines once so clear in Pisgah Forest started to fade.

In the years that followed, hunters were no longer required to check in at Pisgah and other management areas of the state. Instead of daily hunt permits, hunters bought a season permit that allowed them to hunt on any management area in the state. The check stations and refuge manager houses were torn down or moved off the forest. Enforcement was left to Wildlife Protectors, who sometimes lived far from the refuges. The 24-hour-a-day dedication of resident managers, who controlled poachers and free-running dogs, became history.

It is interesting to note the most recent deer harvest surveys. Though equal numbers of male and female deer are born each year, it seems that more bucks are always harvested. In the 2005–2006 season, hunters took 78,096 antlered bucks, 8,254 button bucks and 57,965 does. As Wayne predicted, some hunters have still not shaken the old stigma against shooting does.

Deer hunters still like to come to Pisgah Forest, and fishermen still catch trout from its beautiful streams. I suppose that for today's times, the new ways of hunting are more efficient, less costly and perhaps just as effective. The last traces of the long and colorful tradition of deer hunting in the old way ended forever when Wayne retired and his historic old house was moved.

Today it is hard to find even a trace of where those buildings once stood. For me, and I'm sure for some of the old-timers who still recall the North Mills hunts, it was the end of an era. But our memories and the nostalgia we have for those good old days will last until we too fade away.

John Oberheu is a former biologist and refuge manager with the N.C. Wildlife Resources Commission.

AS THE NUMBER OF HUNTERS DECLINES, SO DOES OUR CONNECTION TO THE LAND AND THE WILD FOOD WE OBTAIN FROM IT.

MELISSA McGAW

WHAT ABOUT THE VENISON?

I grew up eating wild game. There was never a time in my life when I didn't like venison, and I feel the same way about wild turkey, though I have picked through a plate of squirrel gravy more than once wondering what the point was. We occasionally had rabbit and pheasant as well, but my dad never used hunting dogs, and those animals are hard to bag without dogs. Rabbit is still right up there with venison as one of my favorite meats, and when I jokingly complain to my dad that he should shoot more of them for me, he looks exasperated and says, "Why don't you shoot a few, if you think it's so easy?"

Why not, indeed? Much like any suburbanite grabbing a package of pork chops at the supermarket, I get my venison tightly wrapped in plastic and neatly labeled. But unlike that supermarket consumer, I know, really know, where my food came from: the forests of Randolph County, W.Va. My dad shot it, cleaned it, hung it and skinned it. If he had help from a buddy, he butchered the whole thing himself as well; otherwise he took it to one of the game processing centers that dot the area. And my mom is the one who wrapped it in neat little parcels and labeled each one with a black indelible marker.

I still get a reliable supply of venison from my folks, and I stock up with packages of frozen steaks and backstrap whenever my wife and I take the winding trek back home to visit family. I get squirrels, too, which I make into game broth, and the occasional rabbit, though usually we cook it while we're there, so we can all get a taste together.

WRITTEN BY SCOTT BELAN

Eventually, though, my father will quit hunting. Just like the rest of us, he isn't getting any younger. And where will I be then? You see, I haven't carried a gun into the woods in 20 years. So I'm saddened but not surprised that hunting itself is on the decline as succeeding generations lose their connection to the sport, to local hunting lands, to tradition. The N.C. Wildlife Resources Commission recognizes this problem; last year, it convened a two-day symposium on recruiting and retaining hunters. The state has seen a 20 percent drop in hunting license sales over the past decade, mirroring similar declines nationally.

In many ways, I am emblematic of the trend away from hunting. I was raised to be a hunter in a small town where it was part of the culture, and where family and friends created a network that supported hunting. For us young boys, the week off from school at Thanksgiving was not so much a holiday break as it was the opening of deer season. But since graduating from high school, I've lived in five different states and had about three times that many jobs. Now and then I think about how much I'd like to spend a chilly November morning walking through the woods, but far more often my thoughts have been on school, jobs, paying the rent, what place to try next.

A LOST CONNECTION

When I eventually settled down, it was in North Carolina, a place where I had no roots, no connection to the land and no knowledge of hunting traditions. I didn't know anyone who hunted, and most of the people I've made friends with in my Durham neighborhood either never hunted or, like me, fell away from it long ago. I like to tell myself that one of these days I'll take the state hunter education course, get my license and hit the Caswell Game Land or some other nearby spot. But the truth is, I was never more than a lackadaisical hunter in the first place, and I now have plenty of other interests and demands on my time. So when my dad does put away his .30-06 for good, I'm really going to miss the venison.

As it turned out, what I was most interested in was not hunting game but cooking it, along with lots of other foods. A couple of years of culinary school and a couple more working in restaurants cured me of the desire to sweat profusely while getting yelled at by a sous-chef with a bad attitude, but as I learned to cook, my love for venison only got stronger.

I'm always amused when people turn their noses up at the mention of venison. "It's gamey, isn't it?" they'll invariably ask. But I don't think most people even know what they mean when they say "gamey." They just have a vague notion that venison has a very strong, probably off-putting flavor, and that by the mere fact of its wildness, it will just be too powerful for their tastes.

Gamey? Well, it is game, after all. What would you expect? Lamb tastes lamby, doesn't it? Beef tastes beefy, and so on. It is natural that wild game would taste wild and gamey.

But the taste of game is something to be celebrated, not feared. It conjures the woods, rich and earthy and satisfying. Given how good venison tastes, it's almost beside the point to note that it is lower in fat than almost any other meat, including the ubiquitous chicken breast, and that it is fairly bursting with iron and B vitamins.

I no longer make the mistake of telling dinner guests that venison tastes kind of like beef, because it doesn't. That's part of its allure — it doesn't taste like anything else. The closest comparison might be to bison, another robust, lean, deeply red meat.

And yet even the small subset of our culture that eats venison seems to be afraid of its real flavor. For evidence, take the prevalence of venison recipes that involve long marinating in soy sauce, overnight soaking, spice packets, seasoning salts or any number of other ingredients that mask flavor rather than enhance it.

F. EUGENE HESTER

Recipe

Venison & Mushroom Stew (serves 6)

A straightforward winter or fall dish, with very bold flavors. While any mushrooms will do, shiitakes go really well with venison, as do any "wild" mushrooms like chanterelles, porcinis or morels.

2 lbs. venison, cut into 1-inch cubes
2 lbs. mushrooms, sliced thick or halved
1 medium yellow onion, diced small
5–6 cloves garlic, minced
1 cup red wine
2 Tbsp. or more whole grain or country-style mustard
Flour
Salt and pepper to taste

1. Season the venison well with salt and pepper, and brown in small batches over high heat in a little oil. Reserve.
2. In a large pot or Dutch oven, sauté onions and garlic over medium heat until translucent, add the venison and wine, and bring to a slow simmer. Add water, if necessary, to just cover meat. Simmer, covered, until venison is tender, 2 hours or more. If necessary, add water to keep venison just covered.
3. When venison is nearly tender, sauté mushrooms in small batches until nicely browned, season each batch with salt and pepper, and add directly to stew. Repeat until all mushrooms are in stew.
4. Stir in mustard.
5. If stew is thin, sprinkle with a small amount of flour to thicken, stirring well. Cook 10 more minutes or so to cook out the flavor of raw flour.
6. Correct seasonings, and serve over plain white rice or buttered boiled potatoes.

KEEPING IT SIMPLE

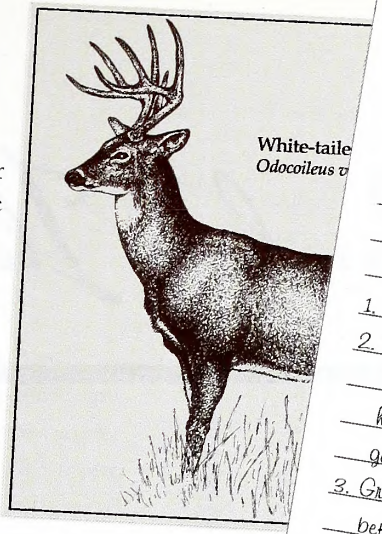
My dad's friends often give him deer they've killed. In part this is because West Virginia's huge whitetail population makes it much easier to kill a deer than it was 20 years ago, and much easier to kill more than one, particularly if you bowhunt as well as gun hunt. But the hunters also tell him they just don't have much use for venison. I can see how someone would enjoy hunting while having no fondness for venison, but I still can't quite wrap my head around killing something that you aren't going to eat. I'm happy to help fill the niche of venison consumer in these cases. But I do have to wonder if people don't like venison in part because they don't know how to cook it.

When I want to make a special meal for my wife, I rub a piece of venison tenderloin with kosher salt and cracked black pepper, drizzle it with olive oil, and grill it rare. No marinating, no tenderizing, no sauces. It tastes like venison, which is exactly how it should taste. By keeping it simple, I am trying to respect that flavor and honor it.

That's not to say I don't love a good venison stew, but even then I want to complement the meat's flavor, not hide it. Garlic and spicy mustard work nicely, and mushrooms are always at home with venison, as well as root vegetables and tender spring peas. One of my favorite ways to eat venison is in place of the beef in a Vietnamese-style cold noodle salad. Flash-fried strips of venison ham steak can really stand up to the intense flavors and textures of Asian food.

It may seem that I am simply focusing on matters of taste, but I think it goes deeper than that. The line that connects us to what we eat seems to get longer and longer every day, and what we put in our mouths evokes the place it came from less and less. Just look at the potato chip display in your local supermarket and tell me we don't have a perverse desire to make a thing taste like anything except what it is: It's a potato, for God's sake! Why would we want it to taste like pizza, cheddar cheese or ranch dressing? It's the same with venison—I don't want to do so much to it that it could be anything. I want to know what I am eating.

Venison could be seen as part and parcel of the small but burgeoning "eat local" movement that is predicated on a resurgence of farmers' markets and small producers of meat, eggs and dairy. The "eat local" credo focuses on freshness, proximity to home and a human rather than industrial scale. Eating venison is a way to celebrate freshness and local abundance just as surely as slicing into that first ripe heirloom tomato of the summer.



Recipe

Grilled Venison Tenderloin (serves 4)

This is the simplest possible treatment of venison. It's also my favorite.

* 1 piece of venison tenderloin, weighing 1.5 to 2 lbs.
* Olive Oil * Kosher Salt * Freshly cracked black pepper

1. Turn gas grill to high, or, preferably, have charcoal very hot.
2. Rub tenderloin with oil, sprinkle liberally with salt and cover very liberally with fresh cracked pepper. Once sliced, each piece is going to have a relatively small proportion of seasoned, cooked surface, so be generous with your seasonings.
3. Grill loin 4–6 minutes per side. Remove to a plate and let rest five minutes before slicing.
4. Serve with roasted or French-fried potatoes and any number of steamed vegetables, tossed in a little butter: green beans, asparagus, sugar-snap peas, etc. You also can't go wrong with a green salad. The goal is to keep the side dishes simple and let the flavor of the meat take center stage.

See more venison recipes at www.ncwildlife.org, the magazine page.

Wendell Berry has written that a "significant part of the pleasure of eating is in one's accurate consciousness of the lives and the world from which food comes. The pleasure of eating, then, may be the best available standard of our health." Berry, a lifelong farmer as well as a novelist, essayist and poet, is writing about agriculture rather than hunting, but his words still apply. Nobody has a better sense of where his meat comes from than the hunter, and nobody is more likely to appreciate the value of a meal obtained through long, hard concerted effort—rising in cold, dark morning and heading out into the world from which his food will come.

If anything, the primary way wild venison differs from an agricultural product makes it more valuable to me: Wild game is one of the only foods that isn't, and can't legally be, for sale. It doesn't have to be inspected, it isn't part of a chain of production, marketing, buying and selling. The trip to the table is shorter, straighter and more direct than it is for a commercial agricultural product such as beef or pork. I like that you can give it to a friend as a gift, but can't sell it. Of course, venison can be bought and sold, just not the wild stuff, and commercial farm-raised venison is gaining in popularity, both for restaurant and retail consumers. However, farm-raised venison is to wild venison what a Butterball is to wild turkey, a blander and less flavorful version of itself. Because it is farmed rather than harvested from the wild, it also is less elemental, not only in its flavor but in the meaning that can be derived from eating it. That meaning comes, in part, from knowing where your meat came from, and having a pretty good idea of how it lived and how it died.

There is simply not much I'd rather eat than a wild venison steak. And so, though I am no longer a hunter myself, I truly lament the decline of interest in hunting, not only in North Carolina but across the country. When our communities don't hunt we lose a part of what connects us to the land and to place itself. We lose the family bonds that manifest themselves in a father buying a gun for his son or daughter and knowing he or she will use it to carry on a tradition; we lose a sense that we belong in the woods and fields. But for me, the worst part is more straightforward: We lose the venison.

Scott Belan is a Durham writer whose work has appeared in The Village Rambler *and* Canoe and Kayak.

The Purchase Isles

WRITTEN BY BLAND SIMPSON & PHOTOGRAPHED BY ANN CARY SIMPSON

AT THE WESTERN END OF *Albemarle Sound*, WHERE THREE RIVERS MERGE, *lies a tangle of islands*

"He stood for a moment — a child, alien and lost in the green and soaring gloom of the markless wilderness. Then he relinquished completely to it."
–William Faulkner, "The Bear" (1942)

The wild swamp rose was in bloom, its pale pink flowers in the old creekside cypress stumps, on the blue-sky June day several years back when Jake Mills and I put in at Conaby Creek and N.C. 45, just east of Plymouth in the three-rivers area of the lower Roanoke River basin. Here the Roanoke and the Middle and the Cashie rivers drain down and, braiding together, very nearly become one. We wound downstream in his 14-foot Boston Whaler for the big river itself and the lower Purchace Islands there. At midweek, only one other pickup and boat trailer lay up in the ramp's parking lot, so we knew we would have both creek and river pretty much to ourselves and that the only noise we'd likely hear other than an osprey's *scree* would be our own.

Out of sight, off in the ripshin-thicket interior of the forest we floated through great patches of pond pine and juniper, protected by impassable pocosin growth — sweetbay and redbay, pepperbush, titi and dog hobble — from any casual foot traffic. As these woods were timbered for cypress over the century between the 1870s and 1970s, the logging was done by barge, and naturalist Merrill Lynch wrote in 1981 that there were "no roads, tramroads, canals, or other landscape modifications within the tract."

Wild country, even at this late date.

Crossing the bar at the mouth of Conaby Creek, the depth finder went to work, its reading dropping from 5 feet quickly to 34 feet out in the big Roanoke itself. This quick shift forecast the wide and rapidly varying underwater topography Jake and I would find as we floated and sounded our way all around the Purchace Islands. Though here in the lower river we were 60 miles west of the Atlantic's breakers, as we headed for the embayment that was Albemarle Sound, we threaded through islands that were essentially *at sea level*.

Jake turned the Whaler downriver from Conaby's mouth, Rice Island now to our left. We passed only the long, narrow Louse Island, spying a few crab pot floats and just one lone cypress as we boated out into Albemarle Sound between Swan Bay and Batchelor Bay, rounding Rice. The brilliant late-morning sun lit the big broad sound with all the light in the world, an unrelenting sheen, and stirred up enough of a breeze that we were presented with a light chop at the mouth of Eastmost River, the distributary of Middle River separating Rice from Goodmans Island.

A look from the lower Middle River, through the cypress trees, out into Albemarle Sound.

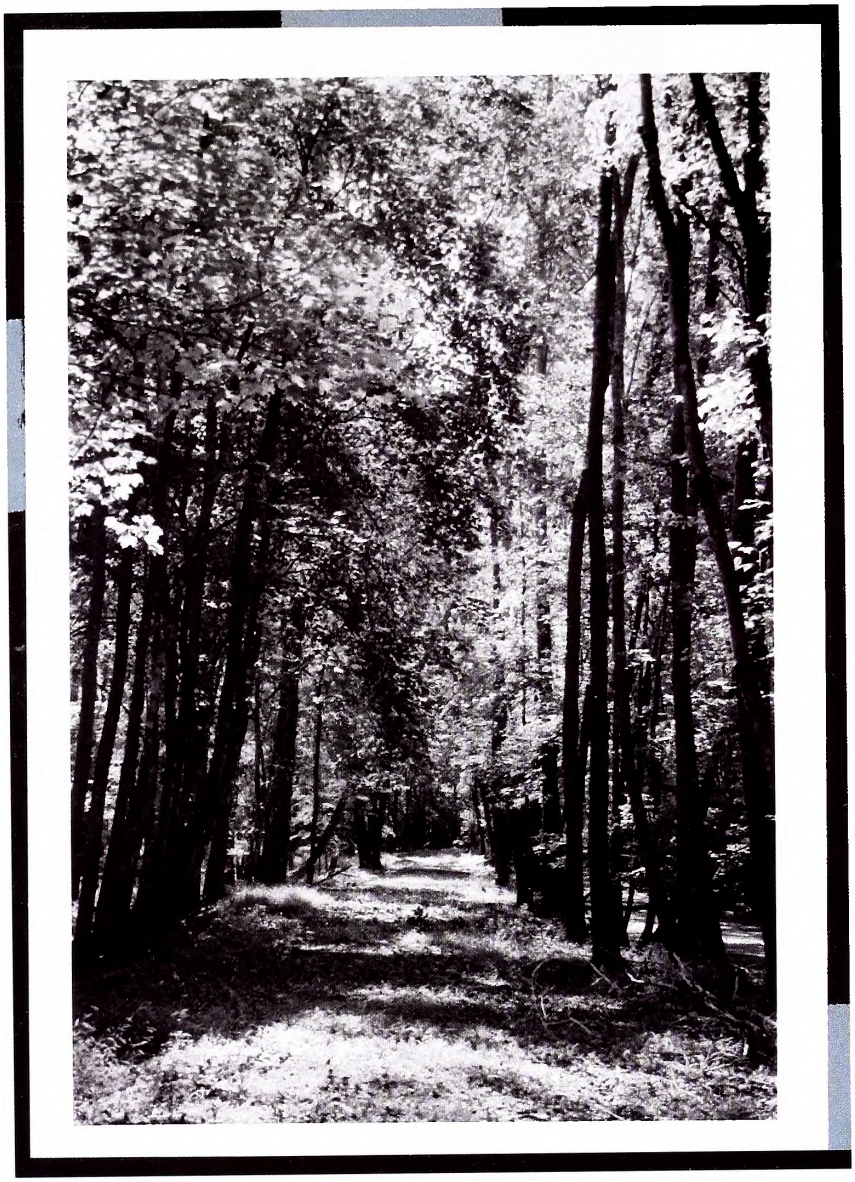
Author, musician and educator Bland Simpson has contributed more than a dozen articles to *Wildlife in North Carolina* over the last 15 years. His many books include "Ghost Ship of Diamond Shoals: The Mystery of the Carroll A. Deering" and "Into the Sound Country: A Carolinian's Coastal Plain."

A member of the Tony Award-winning Red Clay Ramblers, Simpson has collaborated on such musicals as "King Mackerel & The Blues Are Running," "Kudzu" and the Broadway hit "Fool Moon." He teaches creative writing at UNC-Chapel Hill and was the 2005 Fine Arts recipient of the North Carolina Award, the state's highest civilian honor.

His latest work, "The Inner Islands: A Carolinian's Sound Country Chronicle," explores some of the state's many bits of land scattered in the waters inside the Outer Banks' protective barrier. With photos by Ann Cary Simpson, the book discusses the geography, biodiversity and human history of these river, swamp and sound islands. The following is an edited excerpt from one chapter.

"The Inner Islands" is due out in late October but may be ordered now. For more information, visit http://uncpress.unc.edu/books/T-6229.html.

RICH WITH *unique features* AND *wild grandeur.*



For those who want to set foot on one of the Purchace Iles, Conine Island boasts the shady Kuralt Trail.

Mullet were jumping as we crossed the 3-foot bar and found a 20-foot bottom just inside the Eastmost. Every now and again we would pass a pale green stretch of freshwater marsh grass, 20 feet here, 40 feet there, fringing the river's edge, so much brighter than the darker swamp-island woods behind (maple and cedar and pine mostly) that even in this midsummer noontime each reach of grass seemed to shine like a lamp.

At the head, or top, of Goodmans Island, Jake and I found a surprise, a fascinating geo-feature, an enormous hole that the Middle and Eastmost Rivers had collaborated on corkscrewing and scouring out. Right where the Middle distributes Eastmost to the right while going off itself to the left toward the Cashie River, we were cruising smartly along, the Whaler's gauge showing depths of 4 feet, 8 feet, 11 feet and so on, till suddenly the sounding plummeted and hit *sixty-eight feet*. After running down the Middle along slender, drowned Wood Island to the Cashie and coming about near the mouth of Cashoke Creek and Terrapin Point, we returned to this deep hole, swinging the boat back and forth over it this second time till we now hit a depth of *sixty-nine feet*, reckoning the hole to measure about 30 yards across and about 50 yards long, coming upstream from the head of Goodmans Island. Years hence I would learn that natives of Plymouth referred to it as "the tourist hole," because they liked to ride outlanders over it and amaze them with this local mystery spot—whether or not it rivals Iceland's Snaefellsness Glacier as a journey-to-the-center-of-the-earth cavity, it is a most mesmerizing depth nonetheless.

"Don't you wonder what all's down there?" I asked Jake as I stared over the side of the boat, pondering that submarine shaft.

"Well," he said, head and hat brim atilt, studying the depth finder, "I can tell you there're some fish sitting way down there, within just a few feet of that deepest depth—looks like a catfish big enough to *tow* us away from here!"

Up Middle River the Whaler now crept, Huff Island below us, Great Island above, keeping company only with herons, crows and buzzards, the depths beneath us ranging from 10 to 22 feet. When at the Middle's last upstream bend we found a 43-foot hole, Jake pronounced, "Mountainous terrain." He was speaking of the relief of this part of the outer Coastal Plain before the ocean's rise thousands of years ago flooded the sounds and turned a small simple creek into the Roanoke River, one of eastern America's major drains. "That's what these depths suggest." Great Island, off to our right, seemed none too mountainous, though, being flat, layered with boggy, mucky peat, its forest just as swampy as it ever got anywhere: bald cypress and water tupelo. On that island's far side, blackwater creeks named Grennel and Broad lazed into the Cashie River, and sunfish there drew locals with hook and line.

In another mile, where the Middle flows off the Roanoke, we found an osprey on a log, tearing a fish apart for lunch, while a turtle on the log's other end paid neither that proceeding nor our piloting by any mind at all. A few folks fished languidly from the banks

of the Roanoke at the small grassy park that lay between the river and the backs of the short commercial buildings of downtown Plymouth. Time itself seemed becalmed—it might have been 1955, or 1910, 1880 even.

A fine June day indeed: we had had most of six hours in this lowdown territory, the very bottom of the big bottom, encountering only a half a dozen other boats in all. We lazily followed an osprey for a mile or two after lunch and called it a day.

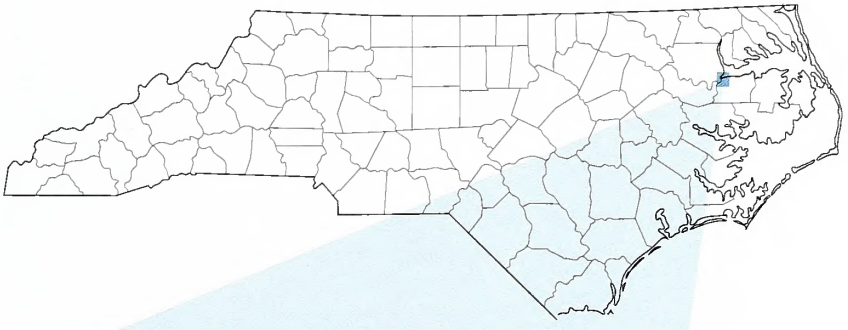
Several days later, I was back home in the red-clay hills when Jake called, hydrology on his mind. "I told Jack Long about our river excursion," he said. "Since he's an engineer by training and works with the soil and water authority I asked him about that deep hole we found, and he said you were right about the corkscrew effect that probably dug and is still digging the underwater well. Said that happens in a lot of places where two creeks meet, as at a place on Blount's Creek where he lives, where the depth drops from about 10 to 30 feet at the conjunction of two tributaries.

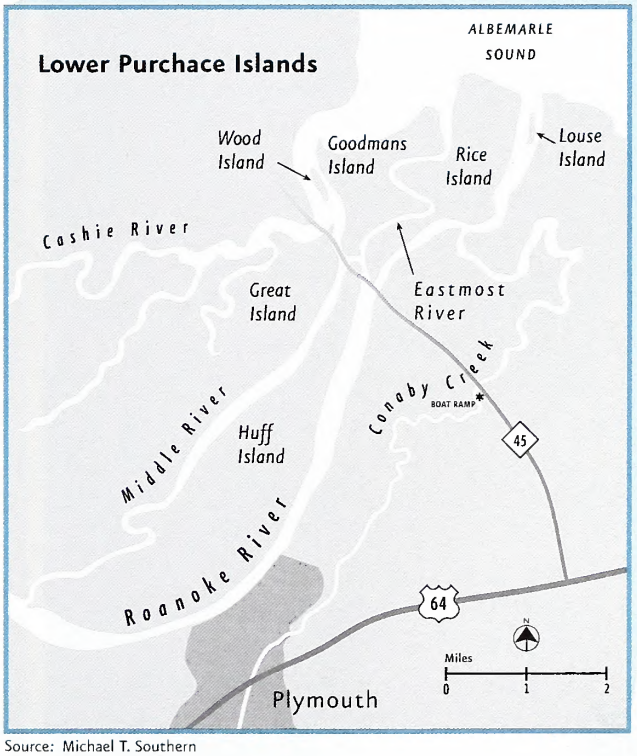
"Guess that's where all the lost things go," Jake said.

In 1977, The Nature Conservancy's Merrill Lynch, a rangy, mustached upriver boy from Roanoke Rapids, threw himself into the cypress and gum flats, the swamp pocosin forests, all of the big Roanoke bottom, and over four years took its measure like few men ever have, emerging with a deeper knowledge of what was growing and living in it than almost anyone since European contact. Maybe the legendary old-time Occoneechee Neck trapper Q. J. Stephenson had once known it better. Maybe. Lynch, though, was the man who in 1981 wrote the plan for how to protect and preserve eastern America's greatest lowland hardwood swamp, and due to this propulsion and guidance there now existed an enormous Roanoke River Conservation Project, 60,000 acres under protection, a figure that may ere long come up to 100,000 acres—a territory very nearly the equal of the nearby Great Dismal Swamp National Wildlife Refuge.

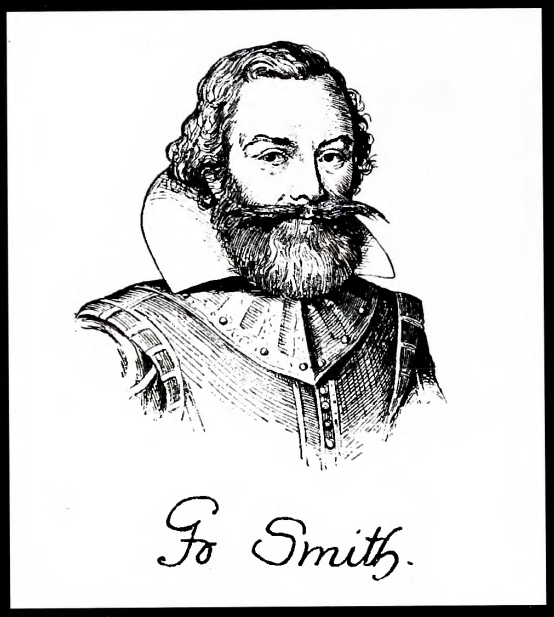
By the summer of 2005, 12 large tent-camping platforms awaited intrepid paddlers, broad wooden floors cantilevered in among cypress and gum, colonizing the floodplain in generally out of the way (what, indeed, in this wild bottom was exactly *in the way*?) crooks with names like Barred Owl Roost, Beaver Tail, Cypress Cathedral and Bear Run—with Lost Boat and Otter One over on the Cashie River, and Tillery, a high-bluff perch over the Roanoke. When in early spring my old friend and fellow Red Clay Rambler Clay Buckner and his then-bride-to-be Jamie Allison boated in (from Gardner's Creek to Devil's Gut to Lower Deadwater Creek) and spent the night at Barred Owl Roost, they found it true to its name. Clay and Jamie said they bore witness to a constant avian concert through the long swamp night, and slept not.

"Being rather knackered we dozed right off, but not for long," Clay told me. "Within moments the swamp around us was alive with the sounds of, as near as I could tell, the Haunted Amazonian Rain Forest. Howler monkeys screamed at each other through the night (all night), ghosts wailed and, pretty frequently, grown women were murdered in the treetops. I have not been in the presence of such an uproar since the last time





Source: Michael T. Southern



'Purchace' was a gift to a friend

Captain John Smith, designator of Heriots Ile, also tagged these lower Roanoke islands as the "Purchace Iles," for they too appear on his 1624 map of Virginia. He did not call them so on account of some Manhattan-style trinkets-for-terrain trade or "purchase," but rather to salute his friend Samuel Purchas (Pur'kus) (1575?–1626), the extraordinarily popular, widely read travel writer of early 17th-century England.

Samuel Purchas himself would never leave England, but Captain Smith would do him the honor and favor of leaving the noted travelogist's name on, or in, the lower Roanoke River isles. Nine of them figure into this collage: Louse, Rice, Goodmans, Wood, Great, Huff, Conine, Tabor and one unnamed island. Though not in the Purchace Islands by name, Jamesville Island, created by Cut Cypress Creek, and the massive, 9,000-acre Bull Run Island are both right in among them. How Bull Run escaped inclusion might mystify one were there not something bigger to consider: the presence upon it of a huge, abandoned and long-lost logging locomotive.

On Conine Island, uppermost of the Purchace group, in the 1950s I saw my first egret. It stood below the U.S. 17 causeway on the downriver side, one leg up, pausing between moments of fishing or perhaps fishing in that extraordinarily patient way of the big wading birds. And, in the early 1960s, one of the wildest thunder-and-hail storms I ever partook of hit right here, just a little east of Conine Creek, a bottom-fell-out downpour so vicious it shook and frightened me more than all Hurricane Hazel's wind and rain had, a storm so loud with rain so blinding that had my mother not pulled our small Chevrolet Bel Air station wagon carefully off onto the road shoulder we might well have merged then and there with all this mighty jungle.

I attended a top fuel drag race. Apparently there is more than one kind of owl out there."

On a little islet back in the Sweetwater Creek area just downriver of Williamston, on a Good Friday float a few years back, after paddling into the bottom beneath hanging hanks of Spanish moss and past tarantula-sized spiders suspended over the shallows and cottonmouths in camouflaged coils almost invisible atop tall cypress knees, a bunch of us stood listening to Jeff Horton of Windsor, then the conservancy's Roanoke preserve manager, as he described the disruptive effects of flows out of the upriver dams at Kerr Lake and Lake Gaston. Destructive flows—too much water standing in the floodplain during growing season. How hard the conservancy and others have worked, trying to get the Corps of Engineers, which regulates the Kerr Lake flows, and Dominion Power, which sets the Gaston flows, to allow water flowing into the undammed lower Roanoke below Weldon to mimic the natural flows of years past, and thereby, to allow the forest and wildlife, the floral and faunal communities within this great refuge, to maintain their character, to sustain themselves and remain something of what they were and had long been.

Not that the natural flows of old hadn't been problematic. Before the dams of the 1950s, heavy spring rains in the upper basin created walls of water—10 or 20 feet high or greater—and sent them cascading down into the lower river, earning the Roanoke its unsentimental nickname, "River of Death." An enormous flood poured through the basin in 1940, rerouting streams, inspiring authors (Mebane Burgwyn's 1947 adventure novel "River Treasure") and cresting at 20 feet, 5 inches at Williamston—the greatest known flood-crest—on Aug. 22, 1940, flood stage there being 10 feet!

Even with managed flows in the here and now, the Roanoke's waters could still be highly unpredictable: though 2002 was the driest year ever on record for the Roanoke River, 2003 was the wettest. During the growing season of 2003, 72,500 acres of Roanoke hardwood bottomland lay underwater from March through August, drowning tupelo and cypress seedlings and putting epic stress upon the great forest. Once the basinwide flood-waters fell away back into the river's channel, what they left was a foot or two of sludge, and

when Hurricane Isabel came in at Hog Island later in September and headed for the western Albemarle, Isabel's surge floated this sludge and released it into the lower Roanoke and occasioned one of the biggest fish kills the river has ever known—even doing in eels.

As N.C. Nature Conservancy's director of science and stewardship Sam Pearsall said, critiquing the noxious water of Isabel's legacy: "It takes a *lot* to suffocate an *eel*!"

By the middle of 2005, two full years later, satellite eyes had seen for us an awesome truth: photosynthesis in this basin had not yet recovered from that extended flooding of '03. Pearsall said he had come upon beech trees growing on ridge-and-swale terrain in the bottom where they should not, yet he found no regeneration of bottomland hardwood. "Water impounded on the floodplain wouldn't happen in a naturally fluctuating river," said Pearsall, "but it happens very often on the Roanoke."

After years of stakeholder negotiating for *adaptive management* on the lower Roanoke with Dominion Power, the owner and operator of the two dams downriver of the Corps of Engineers' Kerr Dam, Sam Pearsall was finally, in 2005, able to grin and say: "We've got a plan and it's working. We've got a 40-year commitment—we'll monitor these things and get better flows. Ten years ago they said, 'We start measuring flows and next thing they'll want to measure butterflies.' And now we got butterflies." This long-range monitoring would also include tree seedlings, fish, terrestrial crayfish, aquatic macro-invertebrates and bank erosion—in short, a good deep look into the river's life and health.

Most of the water in the Albemarle lagoon, the largest enclosed embayment in the world, comes from Albemarle Sound, and most of the water in Albemarle Sound comes down out of the Roanoke River valley and through its lowlands and swamps. Pray for this jungle and the freshwater that flows through it. Pray that a tongue of saltwater, which will intrude into Albemarle Sound as the ocean rises, takes its long, slow time getting to and licking away at Swan Bay's deep peat lands at the Roanoke's mouth, for salt will surely melt that peat away faster than methane will rot it.

Anyone wanting a true hold, a powerful purchase on wild territory such as Ike McCaslin learned from Sam Fathers in Faulkner's "The Bear" need look no farther than right here in the lower Roanoke. Going down that river—from its rich blue *camassia* slopes in Occoneechee Neck to its ridge-and-swale territory and its deep and seemingly endless cypress swamps till at last its drowned cypress mouths of Roanoke—is to traverse the massive jungle that met the first Europeans, Ralph Lane and his men in early 1586, when they were pushing on to the brink of starvation, searching for silver as if their souls depended on it.

The Purchace Islands lie in our last big bottom, last of the eastern South's huge hardwood bottomland swamps. The river to which they belong, the Roanoke, is our Amazon. ◆

One of many scores of sloughs cutting through the Purchace Islands in the Roanoke River bottomlands.

LICENSE TO Manage

When the recreational saltwater fishing license goes into effect in 2007, the N.C. Division of Marine Fisheries will at last begin to collect crucial data and funds that will enable the agency to effectively manage coastal fisheries.

WRITTEN BY JIM WILSON

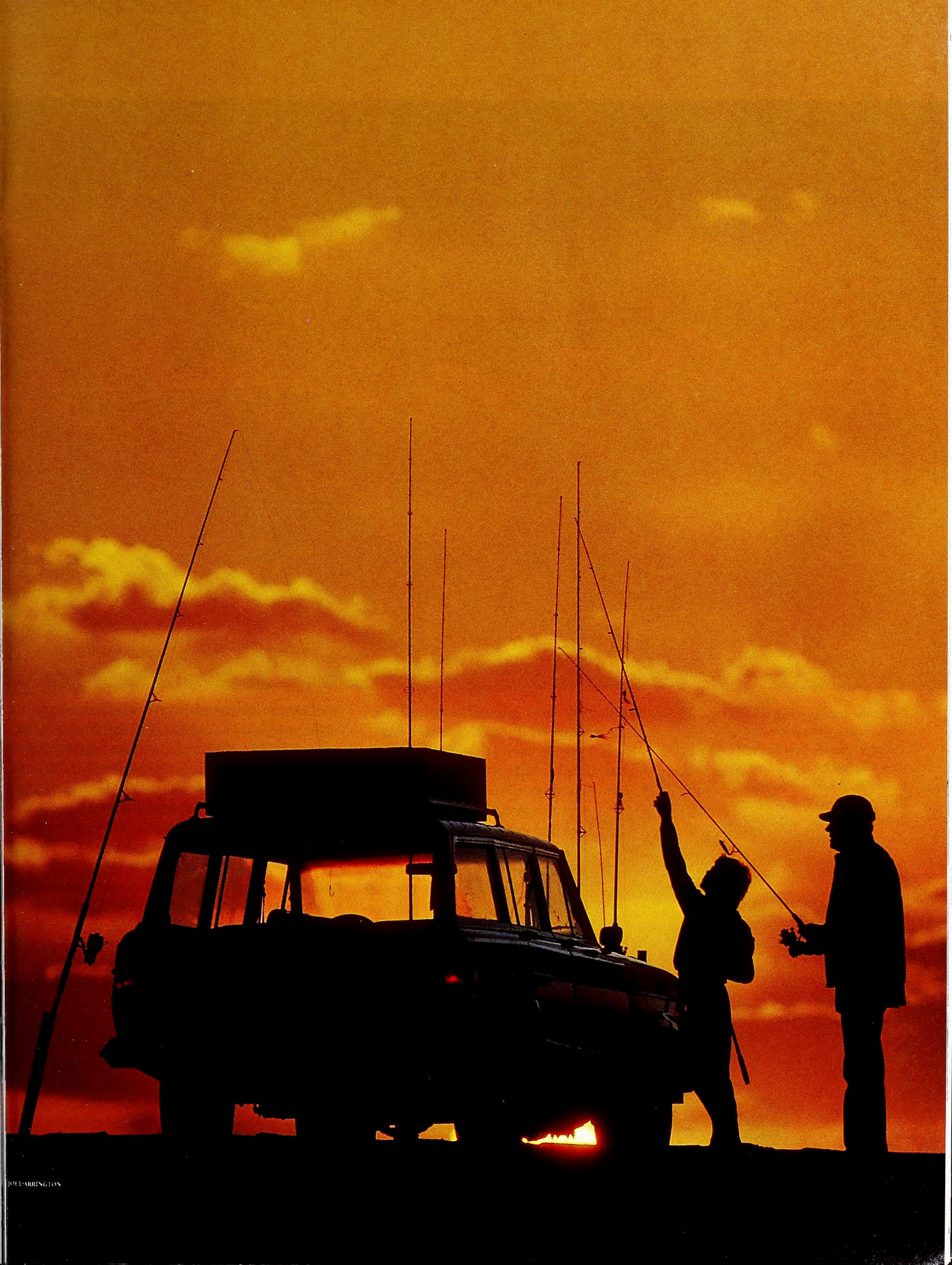
Just three months from now, when striped bass are thick in the cold waters near Oregon Inlet, recreational fishermen in North Carolina will enter a new era. On Jan. 1, 2007, most anglers who fish in the coastal and ocean waters of our state must possess a new Coastal Recreational Fishing License.

The need for a saltwater recreational license has been debated, praised and damned for more than 15 years. A license originally was part of the 1997 N.C. Fisheries Reform Act, a keystone piece of legislation that revamped marine fisheries management in our state.

Under the act, the N.C. Division of Marine Fisheries (DMF) is required to develop fishery management plans (FMPs) for all commercially and recreationally important marine species. The funding for those plans, along with Coastal Habitat Protection Plans, was to have come from a recreational license, but the licensing provision was removed from the bill because its inclusion threatened passage of the entire measure. DMF still had to develop the plans, but without most of the additional personnel and resources license revenue would have provided.

After several false starts, the N.C. General Assembly finally passed a new license bill in 2004 and then revised the measure in 2005. North Carolina was the last state in the Southeast, from Texas through Maryland, without a recreational saltwater license, although Maryland's applies only to the Chesapeake Bay. No state north of Maryland requires recreational anglers to buy a license. Available the first of next year, North Carolina's will be offered in a variety of forms—lifetime, annual and short-term. Most anglers 16 years of age and older will need to purchase the license. Anyone who had a Wildlife Commission lifetime license that included basic inland fishing privileges before Jan. 1, 2006, will not have to purchase the license. (See "Q&A" beginning on page 23 for additional information.)

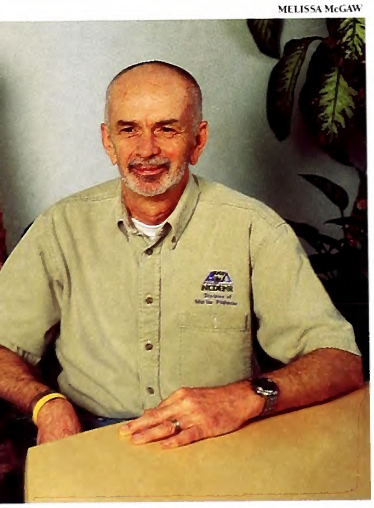
Many recreational anglers, particularly those belonging to advocacy groups such as the Coastal Conservation Association, supported the bill's passage. Others, however, saw the license as just another tax and the end of one of the last free activities available to them. A critical issue among recreational anglers—and commercial fishermen—was that the money raised from the coastal license be dedicated to the marine fisheries of North Carolina.


JOEL·ARRINGTON

NATE BACHELER

Saltwater fishing is big business in our state, with more than 2 million people fishing each year. Preston Pate, N.C. Division of Marine Fisheries director, says the new saltwater recreational license will help his agency better manage fish stocks.

MELISSA McGAW



Commercial fishermen generally opposed the license. Already wrapped in a maze of rules and regulations, commercial harvesters feared that an influx of license fees to DMF would mean the construction of a more elaborate bureaucracy. Their primary concern, however, was that this license would give recreational anglers a greater voice, perhaps an overwhelming one, in how marine fisheries are managed. At the heart of their concern was the possibility of a net ban that would cripple the industry and extinguish an already threatened fishing culture that has existed on the coast for more than 300 years.

With the coastal license now a reality, one of the questions remaining for anglers is what good will come of it. How will saltwater fishing and saltwater fish stocks be better than today?

As director of DMF, Preston Pate is accustomed to the contentiousness that swirls about so many coastal and ocean fishing issues and between commercial and recreational fishermen. Pate, a Snow Hill native, took over DMF in 1997, shortly after passage of the Fisheries Reform Act, and is a longtime supporter of a recreational license. That he has served as the division's director for more than nine years, longer than any other administrator, speaks to his abilities at balancing commercial and recreational interests and finding solutions and compromises for difficult issues.

Marine Fisheries supported the coastal license, Pate said, for two primary reasons. First, the license at last would provide definitive data to scientists as to how many recreational anglers fish in North Carolina each year and what their impacts on fish resources are. The number of recreational fishermen has been estimated from approximately 700,000 (U.S. Fish and Wildlife Service 2001 survey) to 2.4 million (DMF 2005 *Fisheries Bulletin*). The number of commercial fishermen has shrunk to the point that DMF listed 3,890 active commercial harvesters for 2005, when the state had a record low seafood harvest of 79,162,659 pounds of shellfish and finfish. Second, the license would provide a much-needed financial boost to DMF, which has an annual budget of about $20 million. Of that total, about $12 million comes from the General Assembly and the remainder from commercial license sales and various grants.

How will more data and increased funding for a state agency translate into more red drum, spotted seatrout or flounder? Managing a fish or wildlife species would be impossible without reliable data. If biologists do not have a reliable estimation of how

many striped bass or Spanish mackerel or weakfish there are and how many are being harvested, then management of any of those species is a misnomer.

Pate and his staff have been working for months to plan how best to use the money and information that will be generated from the recreational license. "We want to start this process in a way that shows some planning and some logic," Pate said. "We want to come out at the very start of the program with some projects that will provide immediate benefits to the resource and to the public."

Doing so, Pate said, will bolster the confidence of those who supported the bill and legislators who voted for it. It will "dispel any fears the critics have that we aren't doing anything but building a bureaucracy and that the money would not go back to the resource."

Money from license sales will be placed in two funds—the Marine Resources Fund and the Marine Resources Endowment Fund. The latter is for income from lifetime licenses and associated funds, while the former is for other license sales and associated funds. Because Wildlife Commission lifetime license holders with inland fishing privileges were grandfathered into the coastal license, the commission is being required by the General Assembly to deposit $3.4 million into the Marine Resources Endowment Fund. The commission will make five annual payments of $680,000, beginning in 2006 and ending in 2010.

Spending proposals will be reviewed by a committee of three commissioners from the Wildlife Commission and three from the N.C. Marine Fisheries Commission (MFC). If approved, the proposals will go before the nine-member MFC. If the MFC approves the proposals, they will be voted on by the 19-member Wildlife Commission. Should the MFC approve and the Wildlife Commission reject, the governor must decide the issue.

Pate expects few problems with the process. "It might be a little herky-jerky when we start, but I don't see it as being something that we can't streamline very quickly and make it work," he said. "I know there was a lot of concern at various stages in drafting the bill for the saltwater license about the involvement of the Wildlife Commission in deciding where the money would go.

"One of the bills gave it all to the Wildlife Commission, and that didn't seem right to a lot of people. It didn't seem right to me. I was pleased that we were able to come to the compromise that we have, to involve both commissions. My first reaction to that was that it was unnecessary, but upon reflection and the way that I see our agencies working so well together, I'm glad it happened this way. It's going to give us a real good opportunity to get more input as to angler needs, and that's going to be very positive for the long run."

Q&A

WHERE WILL I BE ABLE TO FISH WITH A COASTAL RECREATIONAL FISHING LICENSE (CRFL)?

To fish recreationally in coastal waters managed by the Division of Marine Fisheries, you will need a CRFL. To fish in public inland waters, you need an inland fishing license, available from the N.C. Wildlife Resources Commission. To fish in the joint waters managed by both the Division of Marine Fisheries and the Wildlife Resources Commission, you will need a CRFL or an inland fishing license. The boundaries between coastal, inland and joint fishing waters are marked with metal signs posted adjacent to the affected waters.

WILL THE COST OF AN ANNUAL, INLAND FISHING LICENSE INCREASE?

No. The cost of an inland fishing license will remain the same: $15 for residents; $30 for nonresidents.

I LIVE IN A COASTAL COUNTY, BUT I HAVE A PRIVATE POND ON MY PROPERTY THAT I HAVE STOCKED. WILL I NEED A CRFL TO FISH IN MY POND?

No. Private ponds are exempt from any licensing requirements.

JOEL ARRINGTON

NATE BACHELER

DMF has considerable latitude in spending the license money, although it cannot create new staff positions without the approval of the General Assembly. "It's almost word for word the responsibilities of the Marine Fisheries Commission — enhance, protect, manage, restore, develop, cultivate and conserve marine fisheries resources," Pate said. "That gives you a lot of flexibility in how the funds are going to be used. We're in the process of developing a strategic plan for the use of those monies, because the way those monies will be parceled out will give opportunities for other agencies and institutions to come in and apply for grants. It's going to be like a grant program more than anything else."

Pate foresees academic institutions, government agencies and conservation groups applying for grants. "The strategic plan that we are developing will set some framework on where the major program areas are going to be and hopefully guide the process of receiving applications," Pate said. "We're looking at habitat protection; we're looking at public access; we're looking at resource enhancement through our artificial reef program and our estuarine sanctuary program; and we're looking at public information. Those are the four broad categories."

The collection of data may seem mundane, but it is indispensable to good science.

"In North Carolina we are fortunate in having probably the best harvest information on our commercial sector as any state in the United States," Pate said. "Our program is looked on as a model by many of the other states. We also have a very good program for estimating recreational harvest that generates good information that we use with confidence. The license program will allow us to be more efficient and accurate in collecting and analyzing recreational data."

To gather information on recreational anglers, DMF uses various sampling techniques, including information gained from the Marine Recreational Fisheries Statistics Survey (MRFSS) that is conducted by the National Marine Fisheries Service (NMFS), which oversees fishing in federal waters.

"MRFSS is a coastwide survey that is intended to provide information for monitoring the long-term trends of changes in fish stocks, and it has worked well for that," Pate said. "We [fisheries managers] have tried over the last few years to use that information in a little more precise way than it was capable of being used, and we came under a lot of criticism because of that. NMFS contracted with the National Academy of Sciences to do an analysis of MRFSS and report back how good the survey is, what improvements could be made."

Begun in 1979, MRFSS has two components: onsite interviews with anglers and telephone interviews. The National Academy analysis found a number of problems with MRFSS, including that some coastal states do not participate, states do not gather information in the same way and the program suffers from a lack of funding. MRFSS data were being misused, the National Academy reported. The study found that the way in which MRFSS gathered information provided inadequate data for management and policy decisions. One of the improvements suggested was a national registry of recreational anglers — a licensing system.

"I think that came at a good time," Pate said. "It came after the fact of our license, but it came at a good time for some of the other states that have been trying to get licenses for a number of years. It also emphasizes the point about our improved ability to provide stock assessment analyses in North Carolina now that we have a way to conduct more accurate sampling of our recreational anglers."

Prior to the coastal license, DMF made 25,000 random-digit telephone calls to North Carolina

Q&A

NORTH CAROLINIANS CAN NOW FISH IN INLAND WATERS IN THEIR COUNTY OF RESIDENCE WITHOUT A LICENSE AS LONG AS THEY'RE FISHING WITH NATURAL BAIT. WILL THIS NATURAL-BAIT EXEMPTION EXTEND TO THE CRFL?

No. The new legislation repeals the natural-bait exemption for fishing in public inland waters. Beginning Jan. 1, 2007, any person 16 and older fishing in North Carolina public waters (excluding private ponds) must have a fishing license. People who receive Food Stamps, Medicaid or Work First Family Assistance may receive a subsistence waiver through their county Department of Social Services. This annual waiver exempts the individual from the basic fishing license requirements and allows the holder to fish recreationally statewide with hook-and-line in inland waters (with the exception of Public Mountain Trout Waters), joint and coastal waters.

WHO WILL HAVE TO PURCHASE A CRFL?

Any person 16 years or older who wants to fish recreationally in any water designated as coastal and joint waters of North Carolina must purchase a CRFL. The exceptions are: a. An individual who holds a resident/nonresident lifetime infant, youth, adult, over 70, disabled sportsman, lifetime comprehensive fishing license, hunting/fishing basic disabled veteran or hunting/fishing basic total disabled license issued by the Wildlife Resources Commission before Jan. 1, 2006. b. An individual who holds a lifetime legally blind or adult care home license, regardless of when it was issued. c. An individual who holds a valid annual basic or comprehensive fishing license or annual sportsman license may fish in joint waters without a CRFL.

JOEL ARRINGTON

residents each year. If a respondent acknowledged that he fished in salt water, he would be asked a set of questions. If he did not fish, the surveyor would move on to another number. That information, combined with a random dockside survey, provided the basis of DMF's recreational statistics.

"There's a level of efficiency there that should be obvious, and that's the random-digit phone calls," Pate said. "Out of 25,000, if we get 20 percent hits on our successful angler search, we're lucky. Now that we have the angler registry through the license, we pick 25,000 names out of that registry and call them. Our level of accuracy is improved because our sample size has exploded exponentially.

"In North Carolina, at least, we're going to be able to address a lot of deficiencies that have been associated with the MRFSS program and improve the information that goes into our stock assessment. Then we have an improved analysis of the health of the stock, and with the angler registry, we'll have a better characterization of how the anglers use those stocks. We'll be able to make better decisions about allocations, if that's necessary, about setting seasons, about resolving user conflicts that might come up from time to time. That level of information, coupled with the already good level of information we have with our commercial industry, is going to be a real asset to us."

Armed with data and funding and with four broad categories of concern to attack, Pate said the first projects DMF tackles could be related to public access. That has become a topic of concern all along the coast and particularly in Carteret County, where one advocacy group, Down East Tomorrow, unsuccessfully lobbied county commissioners to pass a one-year building moratorium. Problems of access have cut across the commercial and recreational sectors and range from the loss of fish houses and their docking facilities to residential, closed-gate communities that gobble up waterfront to the coastwide loss of ocean fishing piers (See "Pier Pressure," June 2006).

"The public is being limited more and more in its opportunities to get to the water," Pate said. "The lack of boating access areas is certainly one of concern to us. The concern is that if we don't act very, very quickly, those sites that are suitable for that type of access are going to be gone. Already they're expensive, but expense and availability are two different matters entirely. My concern is the availability of suitable sites for that sort of development being lost to residential development that is going at such a rapid pace on our coast right now. We want to try and do something about that, and that will involve doing some more cooperative projects with the Wildlife Commission along the way."

In just 10 years, North Carolina has lost a dozen fishing piers, some from hurricane damage, others through development. Pate said there may be some justification for DMF to become involved in the ocean pier business. "That's a very expensive proposition," he said. "There are a lot of liabilities that go along with that form of public access that other forms don't have. Maintenance is a problem; insurance is a problem; safety of the patrons is a problem. If we don't maintain some kind of access in that form, then North Carolina's coast is going to lose

North Carolina's commercial fishermen, such as those who captain these trawlers at Oriental, have been licensed for years. With a few exceptions, recreational anglers, whether or boats or land, will need a license as of Jan. 1, 2007, or risk receiving a citation.

MELISSA McGAW

JOEL ARRINGTON

a lot of its character, and the people that use those piers are going to be left without access.

"Those types of piers provide really good, inexpensive access to lower-income anglers. They don't have to have an expensive boat to get out on the water. They pay a minimal fee to go out and have a good time and catch some good fish. If those facilities disappear, those people aren't going to have many, if any, places to go to."

The most critical issue facing DMF, Pate said, is that of habitat protection, which is intertwined with coastal access issues. Take a look at just about any area of the North Carolina coast, and you will see more people, more houses and more businesses than you did a few years ago. The effects of that development on North Carolina's natural resources can be calamitous.

"You create a situation then of putting a lot more stress on the critical habitat of a lot of these fish and shellfish species, because the development is taking place right along the shoreline," Pate said. "It's adjacent to a lot of the primary nursery areas that we have, so you invite more boating activities, which are disruptive to the stability of those environments. You invite upland runoff in the form of bacterial contributions, nutrients and herbicides and pesticides from the manicured lawns. You invite a lot more pressure on the adult fish, because there are more people there trying to catch them. So, I think the state needs to look at very carefully and be very serious about habitat protection for these species.

JOEL ARRINGTON

The Coastal Plain's natural beauty and its great fishing, such as for red drum on the Outer Banks, attract millions of visitors each year.

"We don't have the gray trout populations that we once did; we don't have the croaker populations—adults I'm talking about, now. The juveniles are still good, but for some reason the adults are not as numerous in those areas as they were. A lot of people think it's water-quality related. The problem is being attributed to the impacts of the large drainage basins like the Tar-Pamlico and the Neuse river systems. That's one gigantic problem for Pamlico Sound."

Solutions, Pate said, also will have to involve local governments, and he used the example again of Down East Carteret County because of its natural resources. "That peninsula of Carteret County between Core Sound and Neuse River is penetrated by some of the most productive nursery areas we have in the state," he said. "Farming down there already has had a huge impact on the quality of those environments, changing the hydrology and the quality of the environment. Now urban development is getting a lot of attention, and that carries with it associated impacts. Local governments are going to play a big role in improving their willingness and ability to put into place good land-use planning, good land-use control programs that will enhance what the state can do and is doing with its program."

MELISSA McGAW

Among the many DMF projects that enhance fishing is the artificial reef program. Constructed of materials ranging from old railroad boxcars to modern concrete reef balls, these structures are scattered along North Carolina's coast and in the Pamlico Sound. (Locations of the reefs are available online at ncfisheries.net/reefs/index.html.) The reefs have been funded primarily through the Federal Aid in Sport Fish Restoration (Dingell-Johnson) Act. Under that act, a sales tax is applied to recreational fishing gear and the money returned to the states.

Pate would like to expand the reef program with recreational

license funds. "They are heavily used, very popular dive sites and angler sites, and, I think, a good use of the money," he said. "It's something we can be very responsive to quickly if we get the resources to expand some of those sites."

Pate's fourth major area of concern, public information, at first might not seem directly related to conservation or resource management, but it plays a vital role for any fish and wildlife agency. The public needs to understand why management decisions have been made, and DMF is faced with complicated issues by the score.

"It's amazed me how rampant misinformation is among the user groups, how easy it is to generate that misinformation and how quickly it spreads throughout the community," Pate said. "I honestly think the public needs a better understanding of the complexities of fish management, the difficulties we have and the extent we go through to provide the best information and data that we possibly can."

At some time next year, as data and funding generated by the recreational licenses begin to accumulate, Pate will retire after 35 years of state service, much of it in upper management with both DMF and the Division of Coastal Management. His wife, Pat, retired in the spring of 2006. "She is insufferably happy," he said with a laugh. "I'm terribly jealous of the way it's changed her mood and attitude about things.

"I'll be looking at some time next year, no definite time yet. I really wanted to stick around and see the saltwater license implementation through and get that off on a good start. Unless something's in the General Assembly that's important to the program that I might be able to have some positive effect on seeing through, it'll be pretty soon after the first of the year."

Pate said he has enjoyed his tenure at DMF, despite a steady diet of contentious issues. "It's been really good to work with the people and the staff. That's what keeps me motivated—the quality of people we have on the staff. Their dedication is remarkable and it's made it fun."

Pate's outside interests run from recreational fishing to cycling. At one time, he was riding his bicycle about 5,000 miles each year. He also is a licensed contractor and plans to build one or two homes each year after retirement.

Of course, Pate has done considerable building at DMF and, despite financial limitations, has helped that agency become more successful and respected than perhaps it ever has been. As he steps aside, Pate leaves DMF in solid shape and ready to embark on an era that in just a few years could drastically reshape marine fisheries in our state. ◆

Jim Wilson is associate editor of Wildlife in North Carolina *magazine.*

Q&A

WHAT TYPES OF INDIVIDUAL CRFLs WILL BE AVAILABLE AND WHAT WILL THEY COST?

Several individual CRFLs will be available to accommodate a variety of needs and situations. They include short-term licenses; annual licenses; lifetime licenses, which are valid for the lifetime of the holder; and unified licenses, which include hunting/statewide fishing privileges.

WHERE WILL I BE ABLE TO PURCHASE MY CRFL?

A CRFL can be purchased 4 ways: a. Go to the Wildlife Resources Commission's Web site, ncwildlife.org. b. Visit a Wildlife Resources Commission Wildlife Service Agent. Most are located in bait-and-tackle shops, hunting and sporting goods stores and larger chain stores across the state. c. Call toll-free, 1-888-248-6834. Hours of operation: 8 a.m.–5 p.m., Mon.–Fri. d. Visit one of six Division of Marine Fisheries offices located on the coast. For locations, go to the Division of Marine Fisheries Web site, ncfisheries.net

WHAT TYPES OF BLANKET CRFLs WILL BE AVAILABLE?

Who will be eligible to purchase one? Two types of blanket CRFLs will be available only through Division of Marine Fisheries offices: a. For-Hire Blanket—a person who operates a "for-hire boat" (i.e., charter boat) may purchase a CRFL that will allow all individuals on the for-hire boat who do not hold a CRFL to fish in coastal fishing waters that are not joint fishing waters. This license does not authorize individuals to fish recreationally in inland or joint fishing waters. b. Ocean Fishing Pier Blanket—a person who operates or owns an ocean fishing pier and who charges a fee to allow a person to fish recreationally from the pier may purchase an Ocean Fishing Pier Blanket CRFL. This license allows all individuals who do not hold an individual CRFL to engage in recreational fishing in coastal waters while on the pier.

WILL THERE BE A CRFL BOAT LICENSE I CAN BUY SO MY GUESTS DO NOT HAVE TO WORRY ABOUT PURCHASING AN INDIVIDUAL CRFL?

No. The intent of the legislation creating the CRFL was to license the individual so the state could assess more accurately the impact of recreational fishing.

WILL I NEED A CRFL TO HARVEST CRABS, MUSSELS, CLAMS, LOBSTERS, SHRIMP AND OTHER SHELLFISH?

No, the license is only required for the recreational harvest of finfish.

WILL ANGLERS WHO USE GIGS AND CASTNETS TO HARVEST FINFISH RECREATIONALLY BE REQUIRED TO HAVE THIS LICENSE? Yes.

WILL I NEED A CRFL TO FISH FROM A PRIVATELY OWNED PIER? Yes.

WILL I BE ABLE TO SELL MY CATCH IF I HAVE A CRFL?

No. Seafood harvested under the license is for personal consumption and cannot be sold.

Mushrooms of Fall

Pumpkins, oysters, honey, puffs of black smoke and foul smells come to mind when North Carolina mushrooms appear in autumn. Get to know these five unique fungi.

written by Mark Joyner

KEVIN ADAMS

MARK JOYNER

MARK JOYNER

MARK JOYNER

The thankless role as nature's decomposers endows mushrooms with the amazing ability to break down organic compounds and thus recycle nutrients.

MARK JOYNER

North Carolina's five fall fungi (clockwise from bottom left): puffball, jack-o'-lantern, oyster, honey and stinkhorn.

What is orange, glows in the dark and is seen every year around Halloween? No, it's not radioactive pumpkins, but that's close. It's the jack-o'-lantern mushroom, whose brilliant orange color does indeed resemble that of a pumpkin. Large clumps of these mushrooms appear in the fall around the base of oak trees, on rotting stumps and on buried roots in yards and grassy areas. It's not unusual to find colorful clusters up to 2 feet across, popping up at the same site year after year.

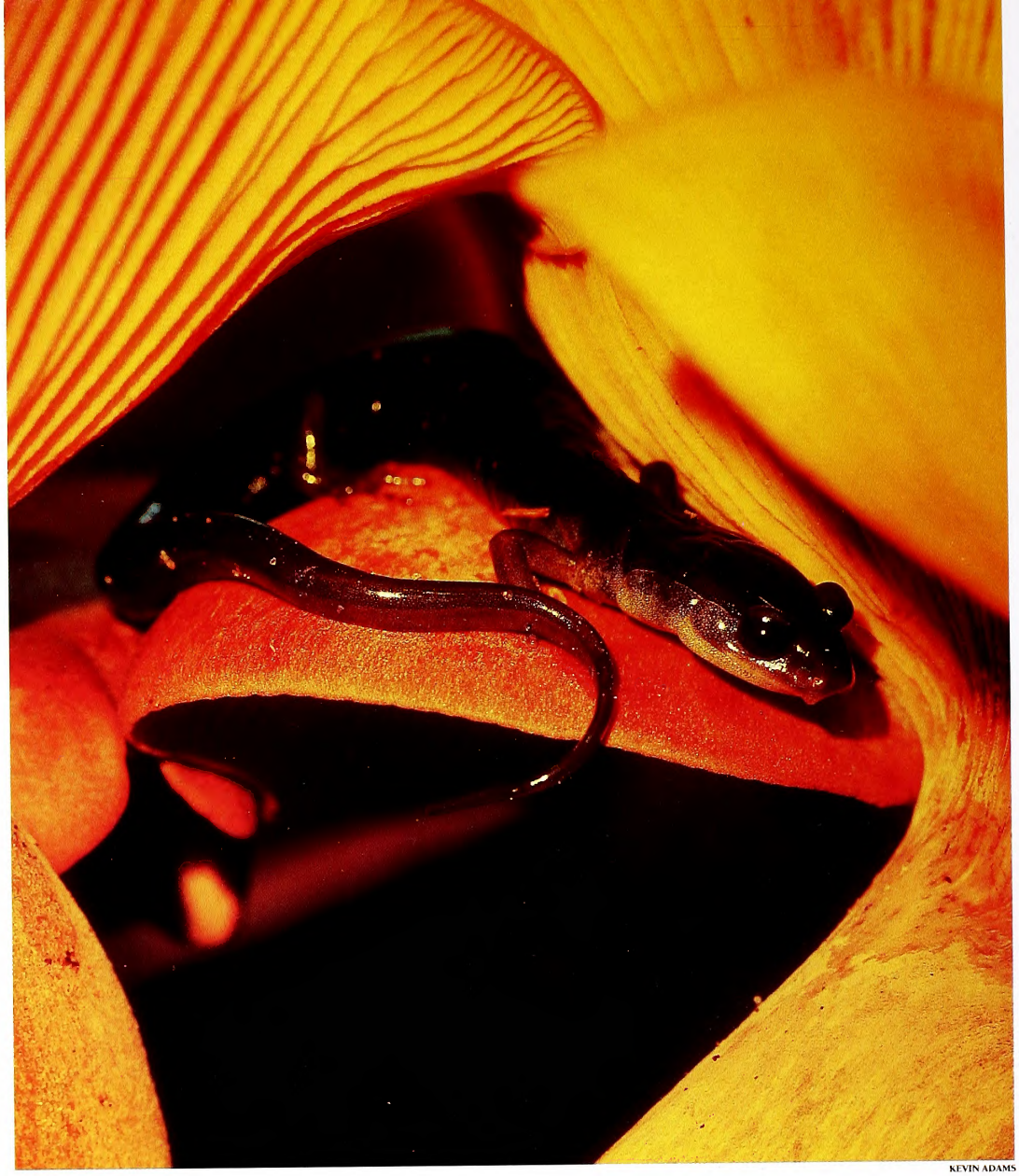
The jack-o'-lantern is perhaps most remarkable for its bioluminescence, an eerie green glow given off by the gills on the underside of the fleshy fungus. The curious phenomenon is sometimes referred to as foxfire, a term that has nothing at all to do with foxes but instead comes from the French *faux*, or false, fire. Although foxfire is more commonly associated with the related and abundant honey mushroom, both these parasitic species found on wood are known for giving off a pale, ghostly light.

The best method for observing the glow is to bring the mushroom indoors to a completely darkened room. (Careful: it can stain hands and clothing!) Give your eyes time to acclimate to the darkness, and you'll soon see a faint glow emanating from beneath the mushroom cap. Tales abound of being able to write a letter or read a newspaper by its radiance, and of lost campers finding their way back by its light. There are even accounts of World War II soldiers in tropical jungles tipping the ends of their bayonets and helmets with similar glowing mushrooms to avoid running into each other. Usually, however, the effect is far more subdued.

The strange glow is caused by the presence of a light-emitting enzyme called luciferase, the same chemical that enables fireflies to blink on and off and locate a mate. The luminescence of the jack-o'-lantern appears to serve a far less romantic purpose. It is thought to be a means of transporting waste products from the buried parts of the fungus out through the above-ground gills, somewhat like exhaling a toxic gas.

And speaking of toxicity, the jack-o'-lantern is a drastic poisoner if consumed. Although not fatal, symptoms can include severe stomach cramps, vomiting and diarrhea that last over several days. It's interesting to note that the jack-o'-lantern looks so appealing and has such a pleasant aroma that there are reports of repeat poisonings of individuals who've tried the fungus a second time.

The jack-o'-lantern's toxicity may turn out to be its greatest contribution to mankind. Its toxin was shown to have potential anticancer properties over 30 years ago but was considered too poisonous to use on humans. Recently, scientists have isolated the toxin and are harnessing it to selectively shrink or destroy cancer cells without harming healthy ones.



KEVIN ADAMS

The lifesaving qualities of a fungus shouldn't come as a surprise. Penicillin, the first of the so-called wonder drugs, was itself derived of a mold fungus in the 1940s, and its antibiotic properties saved untold thousands of lives on World War II battlefields. It would be a wondrous thing indeed if the next medical breakthrough comes from something as humble as a mushroom, and proof perhaps that miracles can be found in even the lowliest forms of life.

As for the honey mushroom, although it may never lead the way to medical frontiers, it can lay claim to a rather amazing distinction. A specimen in eastern Oregon has recently been found to cover more than 2,000 acres and is now believed by mycology experts to be the largest living organism on earth. It may also be the oldest; DNA samples have dated the far-flung fungus at over 2,000 years old.

Like the jack-o'-lantern, the honey mushroom is found in the fall on trees, stumps and roots. Its rootlike threads, known as mycelia, aggressively invade under the bark of the trees to seek water and nutrients, and can grow up to 3 feet a year. The bad news is that the honey mushroom is a serious parasite, eventually killing the trees it feeds upon. Spreading from tree to tree, it can wipe out an entire forest, causing serious economic loss and environmental damage.

Ironically, another fall mushroom is now being touted for its capacity to undo ecological damage. The thankless role as nature's decomposers endows mushrooms with the amazing ability to break down organic compounds and thus recycle nutrients. So efficient is the oyster mushroom that it acts like a biological filter in the clean-up of toxic wastes such as PCBs, DDT, other insecticides and oils. This bioremediation, as it's called, not only cleanses the soil but stimulates the natural processes of environmental recovery at a fraction of the cost of more invasive and controversial alternatives.

Clusters of oyster mushrooms are often found clinging to the sides of oaks, poplars and other hardwood trees throughout the fall and even into winter. A downed tree or a broken limb offers a ready point of entry for the so-called "shellfish of the forest," which does indeed resemble an opened oyster. It's a well-kept secret that this common fungus is a choice edible, with the flavor, aroma and texture of its seafood namesake. Oyster mushrooms are becoming popular in supermarkets while growing largely unnoticed in our back yards and woods. Before attempting to harvest your own crop, be advised that no mushroom should ever be eaten unless it's been positively identified by an expert.

BILL LEA

BILL LEA

RICH STEVENSON

Far left: A cluster of jack-o'-lanterns provides cover for a Jordan's salamander. Middle, top to bottom: Puffballs are found on decaying wood, while honeys often parasitize live wood. Near left: An open earthstar puffball.

And speaking of unexpected usage, who would have credited the lowly puffball with emergency lifesaving traits? Yet the puffballs that suddenly appear in the yard after a summer rain were once valued for their ability to stanch bleeding. In earlier times, dried puffball powder (actually the microscopic spores) was well known as a styptic and was kept on hand by the local barber, who doubled as a surgeon. The spongy white insides of fresh puffballs were sometimes used as surgical dressing, and there are accounts that the fumes of larger specimens had a chloroform-like effect on patients. Beekeepers have even been known to blow the spores into hives to tranquilize the bees.

Although most puffballs grow no larger than a softball, they can at times reach astonishing sizes. A record 5-foot specimen was said to have been mistaken for a sheep. Even the tiny varieties possess some rather curious traits. One found at the North Carolina seashore is sometimes known as the barometer earthstar. In dry weather it remains closed like a normal puffball, but with approaching rain, its sides peel back to create a starlike shape and better release its spores into the air. As the rains pass and the mushroom dries, it closes again; the entire process can take place right before your eyes in just a few minutes' time.

And as far as releasing spores, the puffball surely takes top honors. Mycologists — those who study all things mushroomy — have calculated that a good-sized puffball can produce up to 7 *trillion* spores, each of which is so tiny as to be measured in microns and invisible to the naked eye. Collectively, they form the familiar black "smoke" sent forth when the puffball is disturbed or pelted by raindrops. The spores are wafted by breezes and carried afar. Only a very few settle where conditions are right for growth.

And, although they hardly look it, puffballs are much valued by some people for their edibility. They were a staple of the diet of some American Indians, who collected and dried them for the long winter months. A favorite Iroquois recipe called for frying peeled and sliced puffballs in bear grease. Fortunately, puffballs are among the easiest mushrooms to recognize and are in fact known as one of the "foolproof four" (the other three being morels, shaggy manes and sulfur shelf mushrooms). Even so, young puffballs can resemble the early growth stages of some extremely poisonous species, and as with all mushrooms, collecting and cooking should be done only by a knowledgeable, experienced person.

One mushroom that hardly needs such a warning is the stinkhorn. Its nauseating odor gives fair warning to one and all yet is wildly attractive to flies and other insects, which visit and then spread the slime-coated spores. In medieval times stinkhorns were thought to be a cure for rheumatism and gout. At the same time, they were known as "the devil's eggs" and blamed for witchcraft, cholera epidemics and other assorted evils.

Mushrooms have long been objects of superstition, of course, and often associated with the dark arts. Fairy rings, mushrooms that appear in perfect circles in yards and grasslands, were reckoned to be the tromping grounds of the little people or demons of one kind or another. The rings actually represent the growth pattern of several mushroom species that spread outward in all directions from a single starting point. As the ring exhausts soil nutrients in its wake, the leading edge pushes ever outward. The stuff of legends turns out to be a persistent and costly turf disease. If undisturbed, the ring grows larger year by year and can reach enormous size over time. Some measure up to half a mile in circumference and are thought to be hundreds of years old.

It's somehow fitting that such intrigue surrounds the world of mushrooms. Being neither true plants nor animals, they instead make up a kingdom unto themselves. With no need of sunlight for making food, they thrive in out-of-the-way places. And with no leaves, stems, stalks, roots or seeds, they have proven to be extremely successful at their alternative lifestyle. Perhaps someday they'll even be granted the respectability they so richly deserve. ⬘

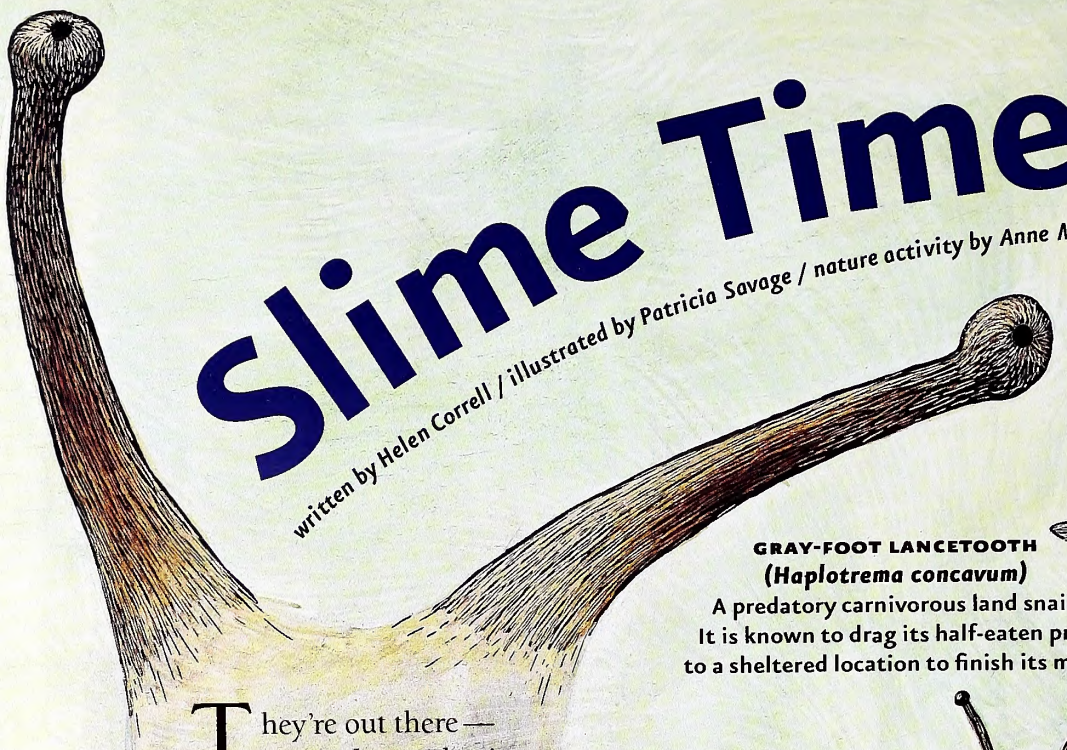
Mark Joyner is executive vice president of the North Carolina Aquarium Society and a veteran mushroom stalker and naturalist.

NATURE'S WAYS

Why Do Mushrooms Grow In Rings Around Some Woodland Trees? **See Nature's Ways, page 39.**

Slime Time

written by Helen Correll / illustrated by Patricia Savage / nature activity by Anne M. Runyon



GRAY-FOOT LANCETOOTH
(Haplotrema concavum)
A predatory carnivorous land snail. It is known to drag its half-eaten prey to a sheltered location to finish its meal.

They're out there—everywhere. They're sliming across your backyard garden and creeping up tree trunks in the woods. Some are munching algae in country ponds or creeping along river edges. At this moment some are inching up cordgrass in brackish marshes, crawling about on the ocean floor. Want to see one? Tonight, go out your back door and look for the telltale sign that one is nearby: mucus trails glistening in the moonlight. Follow a trail very carefully. At the end of it you will find . . . a snail!

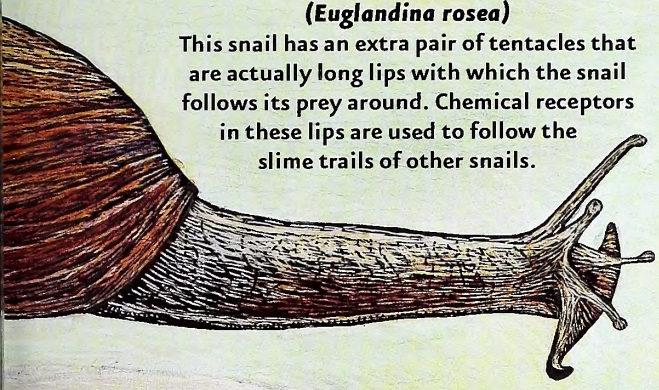
North Carolina is home to as many as 200 species of land snails, 46 species of pond snails and more than 725 species of ocean-going marine snails. Most are harmless to humans, but some non-native species are serious pests to crops. Some snails are edible; still others endangered. Many are so small that you will probably never see them, others so big and beautiful that people collect them.

GARDEN SNAIL
(Helix aspersa)

MOBILE HOMES

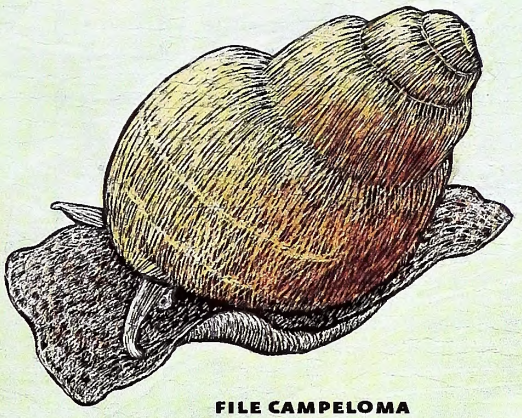
A snail's soft body is protected by a hard, coiled shell that goes everywhere with the animal. Whether on land or in water, this comes in handy when a snail senses danger—all it has to do is retreat into its portable home. Snails can make shells because their blood is rich in liquid calcium. They can separate extra calcium, which forms calcium carbonate crystals, from the blood. Snails deposit the crystals in layers along the outer edge of the shell as it grows in expanding circles.

Snails are mollusks, one type of soft-bodied animals with no backbone. They are in the scientific class gastropod—a name that comes from two Latin words: "gastro," which means stomach, and "pod" which means foot. "Stomach-foot" is a fitting name for an animal that gets around by using the foot on the bottom of his abdomen! Gastropods move by contracting the foot muscle in a regular, wave-like ripple that inches them along at an extremely slow pace. Other gastropods include slugs, cowries and limpets.



ROSY WOLFSNAIL
(Euglandina rosea)
This snail has an extra pair of tentacles that are actually long lips with which the snail follows its prey around. Chemical receptors in these lips are used to follow the slime trails of other snails.

To keep from drying out during a prolonged dry spell, a snail will pull itself into its shell and seal the entrance. Only when the air outside becomes moist again will the animal will come back out. This kind of hibernation is called "estivation," and can happen any time of year, for as long as necessary.



FILE CAMPELOMA
(Campeloma limum)
A common larger pond snail about 1 inch tall.

Snails have many natural enemies. They are not only tasty to humans, but muskrats, raccoons, rodents and even large catfish are known to eat large snails, while snakes, turtles, ducks and geese eat small snails. And don't forget, some snails eat other snails!

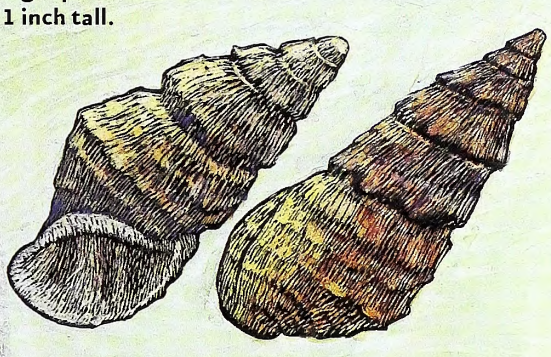
LAND SNAILS

In North Carolina, land snails are found from the Smoky Mountains to the Outer Banks, in damp places because they must have moisture to live. Their bodies are covered in a layer of slime, or mucous, which helps keep them from drying out. On sunny, dry days they hide under rocks, leaf litter or even old flowerpots in your garden. On cloudy, rainy days and at night, land snails venture out to find food. As they move along, their bodies secrete more mucous to help them glide smoothly over rough surfaces. The telltale slime trail is left behind.

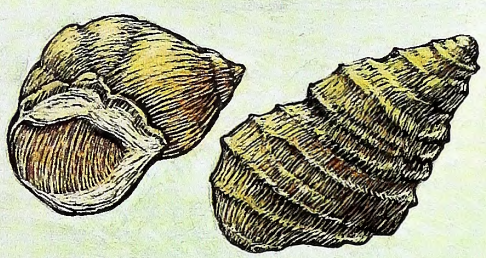
If you look closely at a land snail you will notice that at one end of its large "foot" is a pointed head with two pairs of tentacles. The longer tentacles have not eyes, but light-sensitive eyespots. The smaller tentacles have the snail's sense of touch and smell. A snail breathes by taking air into a small pore on top of its head that is thickly lined with blood vessels.

Inside a snail's mouth are teeth of sorts. They are not typical teeth but more like a tongue made from a rough file. This is called a radula. Many land snails are vegetarians, using the radula to scrape leaf matter or the decaying surface of logs. There are also carnivorous snails that use the radula for grinding meaty food.

Land snails are both male and female — or hermaphrodites. But they still must mate in order to fertilize each other's eggs. Mating involves twisting around each other and covering themselves with foamy slime. After mating each snail searches for soft earth in which to lay eggs. If the weather is warm and damp, the BB-sized eggs hatch in a few weeks. Then the tiny, perfectly formed young snails crawl out of the ground with a big appetite. The first thing they do is search for food.



GRAVEL ELIMIA
(Elimia catenaria)
Common in freshwater streams and rivers.



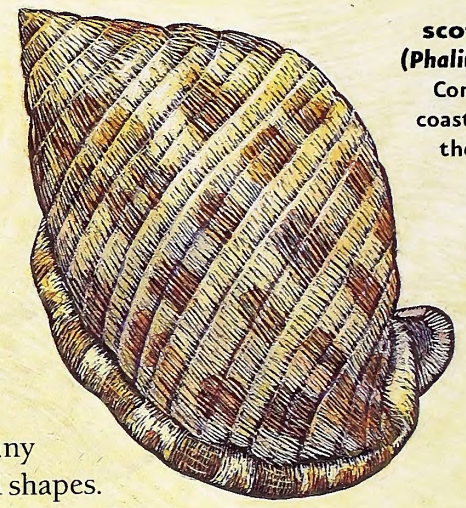
CRESTED MUDALIA
(Leptoxis carinata)
Grazes on algae-covered rocks in clean rivers.

Pond snails are host for as many as 25 various parasitic worms. Some of the parasites affect ducks. Humans are most aware of a group of worms called schistosomes that cause Swimmer's Itch, a reaction that some people have in which red itchy welts appear on the skin.

POND SNAILS

Pond snails are much like land snails. They have shells, a large foot below their stomachs and radula with which to eat. They are also hermaphrodites. But, unlike land snails, pond snails do not bury their fertilized eggs but carry them around until they hatch. There are no carnivorous pond snails. Another difference is that some pond snails have gills for breathing instead of a lung. These snails have a trap door called an operculum, and can live at the bottom of the pond. Those with lungs live near the surface of the pond so that they can easily crawl to the surface to breathe.

Colors in a snail's shell are created from pigments in its food.



SCOTCH BONNET
(Phalium granulatum)
Common in N.C. coastal waters. It is the state shell.

Some marine snails have tube-like siphons that are used for passing water and waste, and a proboscis—a tube that extends out for feeding.

SHARK EYE
(Neverita duplicata)

MARINE SNAILS

Shells of marine snails come in many large and unusual shapes. The shells you find washed up on the beach are the remains of marine snails after they die. Throughout human history marine snail shells have been used for food, money and cooking tools.

Unlike land and pond snails, marine snails have various ways of laying eggs to protect their developing young from the ocean environment. The Atlantic moon snail embeds eggs in a sand and mucus collar that fits around her foot. Whelks produce a spiraling string of little "pocketbooks," with each egg case holding 25 or more eggs. The eggs develop into miniature copies of their parent. When they are still quite small they break out of the egg cases to swim free.

Get Outside

Go on a Snail Hunt: To hunt for a snail during the day you have to think like a snail. Where would you hide if you wanted to stay out of the sun? That's right—in cool, moist places. Look in shady areas, under dead leaves or in old clay pots in your flower garden. If you live near the woods, check out the area around creeks and rotting logs. When you find a snail, if you don't want to get slimed, simply watch it for five minutes. Look for the motion of the foot and the trail of slime the snail leaves as it travels. How many whorls does it have in its shell? If you don't mind some slime, pick up the snail and put him inside (on the side) of a jar. Through the glass, watch how the foot moves the snail forward. In a journal, draw a picture of the snail and write where you found it. Put the snail back where you found it then keep looking. How many different kinds of snails can you find?

Read and Find Out

- "Are You a Snail?" by Judy Allen, Kingfisher Books, 2003.
- "Nature Guide to the Carolina Coast" by Peter Meyer, Avian-Cetacean Press, 1996.
- "Snails of Land and Sea" by Hilda Simon, The Vanguard Press, 1976.
- "Slugs and Snails (Minibeasts)" by Claire Llewellyn and Barrie Watts, Franklin Watts, 2002.
- "The World Beneath our Feet—A Guide to Life in the Soil" by James B. Nardi, Oxford University Press, 2003.

In *Wildlife in North Carolina:*

- "Portable Shelters" by Lawrence S. Earley, August 1987.
- "Naked Goes the Slug" by Lawrence S. Earley, August 1992.

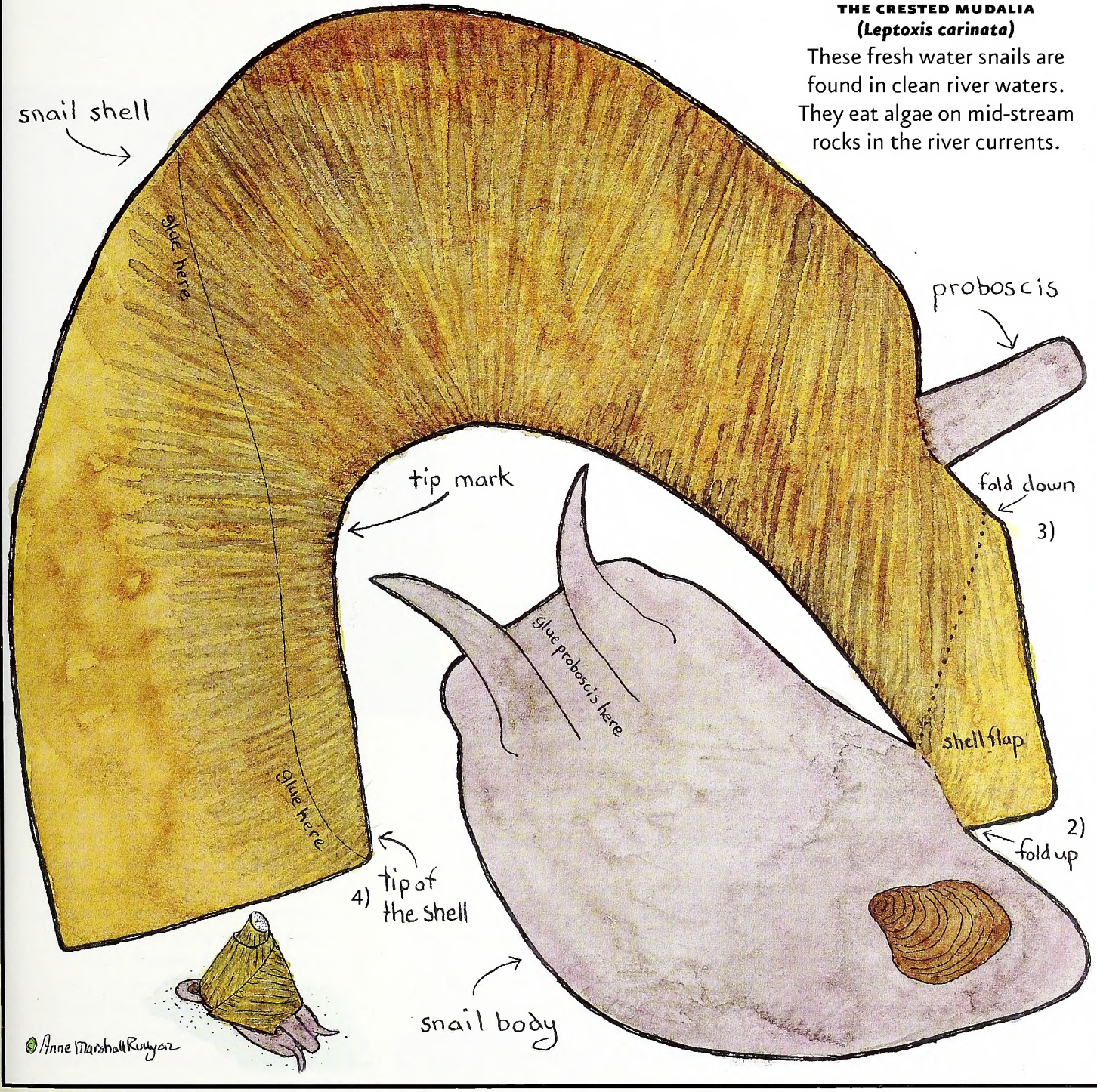
Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Swirling-Shell Snail Sculpture

1) Cut out the snail.
2) Fold body up along - - - line at shell flap.
3) Fold shell down along ····· line at shell flap.
4) Grasp tip of shell and coil shell to the right into a spiral shape. Begin by matching the tip of the shell to the tip mark and glue. Then coil shell along the guideline and glue.
5) Finally glue the proboscis (mouthpart) onto the body, gently pushing the body up to fit snug against the shell edge.

THE CRESTED MUDALIA
(Leptoxis carinata)

These fresh water snails are found in clean river waters. They eat algae on mid-stream rocks in the river currents.



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Weather, Improved Habitat Credited for Duck Population Increase

The preliminary 2006 Waterfowl Breeding Ground Population and Habitat Survey conducted by the U.S. Fish and Wildlife Service estimates a total duck population of more than 36 million, about a 14 percent increase from last year's estimate and 9 percent above the 1955-2005 average.

The survey indicated an increase in the quality of waterfowl breeding habitat in the United States and Canada from 2005. Improvements in Canadian and U.S. prairie habitats were due primarily to average to above-average precipitation, warm spring temperatures and the good summer conditions of 2005. The higher number of ponds counted in Prairie Canada this year relative to last are a strong indicator of the improved habitat conditions.

"There's a lot of good news in the survey this year for the total duck population and waterfowl breeding habitat," said H. Dale Hall, director of Fish and Wildlife. "Most species increased above the estimates of last year, and numbers were above the long term baseline. We're especially excited about the fact that while pintail populations are below their historic average numbers, the survey shows a 32 percent increase in pintail population from the previous year. However, wigeon and scaup are not experiencing those positive trends, and that's cause for concern."

The Waterfowl Breeding Ground Population and Habitat Survey, the largest and most comprehensive survey of its kind in the world, samples 1.3 million square miles across south-central and northern Canada, Alaska and the north-central United States. The survey estimates the number of ducks in the continent's most important nesting grounds.

F. EUGENE HESTER

Annual survey results help guide Fish and Wildlife in managing waterfowl conservation programs under authority of the 1918 Migratory Bird Treaty Act. The agency works in partnership with state representatives from the four flyways—the Atlantic, Mississippi, Central and Pacific—that waterfowl and other birds use during their migrations to establish regulatory frameworks for waterfowl hunting season lengths, dates and bag limits.

Highlights from the survey:

- Mallard abundance was 7.3 million birds, which was similar to last year's estimate of 6.8 million birds and the long-term average.
- Blue-winged teal abundance was 5.9 million birds. This was 28 percent greater than last year's estimate of 4.6 million birds.
- The estimated abundance of green-winged teal at 2.6 million was 20 percent greater than last year and 39 percent above the long-term average.
- The estimated number of 2.8 million gadwall was 30 percent greater than last year and was 67 percent above the long-term average, whereas the estimated number of 916,000 redheads increased 55 percent over 2005 and was 47 percent above the long-term average.
- Canvasbacks numbered 691,000, 33 percent higher than last year and 23 percent over the long-term average.
- Northern shovelers at 3.7 million were 69 percent above their long-term average.

F. EUGENE HESTER

- Although the numbers of most species increased over last year and were greater than their long-term averages, American wigeon at 2.2 million and scaup (lesser and greater combined for 3.2 million) were 17 percent and 37 percent below their long-term averages, respectively. The estimate for scaup was a record low for the second consecutive year. The 50-year average for scaup is about 6 million.
- The abundance of northern pintails at 3.4 million was 18 percent below the 1955-2005 average, although this year's estimate was 32 percent greater than that of last year.

CALENDAR OF EVENTS

Friday–Sunday, Oct. 6–8

Check out at the 20th annual N.C. Seafood Festival on the Morehead City waterfront. Visitors can learn about—and enjoy—seafood, plus see the Southern Outer Banks Boat Show and tour the Navy frigate U.S.S. DeWert. Visit ncseafoodfestival.org or call (252) 726-6273.

Friday–Sunday, Oct. 13–22

Enjoy the wildlife exhibits—including a shooting range, Sensory Safari Trailer and mobile aquarium—craft demonstrations, livestock exhibits and more at the N.C. State Fair in Raleigh. Visit ncstatefair.org or call (919) 821-7400.

Saturday–Sunday, Oct. 14–15

"Carolina Outdoor Journal" will air a segment on John Pechmann, the late chairman of the N.C. Wildlife Resources Commission at 5:30 p.m. on the 14th and 11 a.m. on the 15th on UNC-TV. The segment is about fishing bream beds with a fly rod.

Sunday–Saturday, Oct. 15–21

Meet zookeepers who work daily with the red wolves and learn about the N.C. Zoo's involvement with the reintroduction of red wolves into the wild during Wolf Awareness Week in Asheboro. Various activities will include face painting, storytelling and information booths. Visit nczoo.org or call (336) 879-7000.

Thursday–Sunday, Oct. 19–22

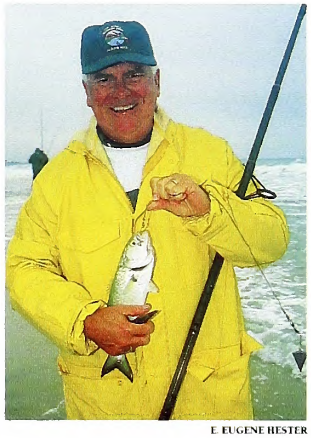
Learn the basics of surf fishing at Joe Malat's Surf Fishing School in Nags Head. School features one day of classroom instruction and one and one-half days fishing the Outer Banks. Cost is $275 per person. Schools limited to 25 participants. Contact Joe Malat at (252) 441-4767, Mac Currin at (919) 881-0049 or visit joemalat.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Weakfish Continue To Demand Special Attention

North Carolina's coastal and ocean fisheries remained relatively stable this year, according to the Division of Marine Fisheries' (DMF) stock status report, with striped mullet being the bright spot, as that stock was upgraded from recovering to viable.

While the striped mullet meets all the criteria for a viable stock, fisheries managers continue to closely monitor mullet because market demand for the fish's roe causes commercial fishermen to target females, potentially reducing the stock's ability to reproduce.



E. EUGENE HESTER

In addition to the change for striped mullet, weakfish were moved from overfished to concerned. According to DMF's Louis Daniel, "Weakfish continue to be a special species to watch, with significant declines in commercial landings over the last several years."

In North Carolina, all overfished stocks either have regulations in place or proposed regulations being developed to stop overfishing and allow the populations to rebuild. The rebuilding process can take many years, especially for long-lived species.

NCDMF 2006 Stock Status

Viable: Atlantic croaker, black sea bass north of Cape Hatteras, striped bass in the Albemarle Sound and the ocean, dolphin, gag grouper, king and Spanish mackerel, Atlantic menhaden, spot, spotted seatrout (speckled trout), striped mullet and shrimp.

Recovering: bluefish, monkfish, red drum, scup and sharks.

Concern: yellow perch, reef fish, American shad, summer flounder, weakfish, bay scallops, oysters and blue crabs.

Overfished: Black sea bass south of Cape Hatteras, striped bass (in waters other than the ocean, Albemarle and Roanoke sounds), Southern flounder, river herring in the Albemarle Sound, spiny dogfish, Atlantic sturgeon and tautog.

Unknown: catfishes, American eel, river herring outside of Albemarle Sound, kingfishes (sea mullet), white perch, hickory shad and hard clams.

ON PATROL

Wildlife Sergeant Wes Barger and Master Officer Wayne Rudd were working a late shooting detail on the Edgecombe-Wilson county line when Barger observed two duck hunters begin shooting after legal shooting hours (5:18 p.m.). The two hunters continued shooting ducks until 5:57, when it was almost pitch dark.

As the two hunters emerged from the swamp, Barger confronted the hunters and observed that they had killed one wood duck and five hooded mergansers. Barger cited the two for shooting ducks after legal shooting hours and for taking more than the limit of hooded mergansers.

In court, one of the subjects pleaded guilty and stated that he just didn't know what kind of ducks he was shooting and that he didn't know what a hooded merganser was. The judge, an avid duck hunter himself, told the man that the reason he didn't know what kind of ducks he was shooting was because it was too dark to see what he was shooting.

ILLUSTRATED BY JACKIE PITTMAN

The judge also stated, "And if I'm not mistaken, the hooded merganser is printed on the Federal Duck Stamp this year (2005–2006), so you should have known what a hooded merganser looked like." He fined the man $100 and the cost of court, made the man pay replacement costs of $123 for the ducks and took his hunting license for a year.

Birding Trail Completes Coastal Plain Site Selections

Site selection for the Coastal Plain component of the N.C. Birding Trail was recently completed. A total of 102 sites east of I-95 have been approved for the trail.

The Birding Trail will be a network of bird watching sites across North Carolina linked by highways and marketed as a single entity. It will connect birders with local communities, businesses and other cultural and educational attractions, increasing nature-based tourism and boosting local economies.

"Birding trails have been successful in more than 40 states, generating ecotourism dollars and providing financial incentives to protect vanishing habitats," said Salinda Daley, N.C. Birding Trail coordinator with the N.C. Wildlife Resources Commission. "The N.C. Birding Trail will provide a marketable resource to attract nature-based travelers to the state and will extend the traditional tourist season, particularly during the spring and fall bird migration period."

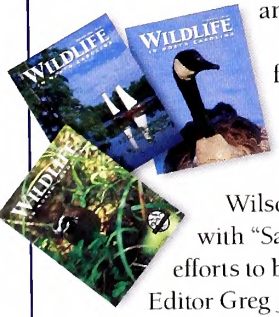
NCWRC

North Carolina has long been known for its tremendous birding opportunities. The Birding Trail sites are composed of federal, state, local government and private lands. They offer chances to see some of North Carolina's most remarkable birds, such as the painted bunting, cerulean warbler, wood stork and flocks of thousands of snow geese.

The commission, along with the U.S. Fish and Wildlife Service, the N.C. Cooperative Extension Service, N.C. Sea Grant, Audubon NC and N.C. State Parks, is working cooperatively to develop the trail. The Piedmont and Mountain regions will see trail development in 2007 and 2008. For a list of the approved sites, visit ncbirdingtrail.org.

WINC Wins Five National Awards for 2005 Work

Wildlife in North Carolina won five national awards, including second place for the magazine, at the Association for Conservation Information annual conference held in July in Orlando, Fla. Associate editor Jim Wilson won first place in two writing categories and also captured third in one of them.



Wilson claimed top honors in the Magazine Article: Wildlife category for "Small Bird, Big Problem," his piece in the March 2005 issue about bobwhite quail management. "A Perception of Abundance," which explained the differences between resident and migratory Canada geese, took third in that category. It ran in the October 2005 issue.

Wilson also won the Magazine Article: Parks, Historical or Cultural category with "Sailing Out of History," a November 2005 story about maritime historians' efforts to build an accurate replica of a colonial workboat known as a periauger.

Editor Greg Jenkins took second place in the same category for an article published in February 2005 called "Unbridled Alliance," which detailed how the health and numbers of wild horses on Shackleford Banks are managed.

WINC has finished among the top three wildlife magazines nationally four of the last five years, including three second-place awards.

Frequent *Wildlife in North Carolina* contributor Gene Hester also won three awards at the Outdoor Writers Association of America conference in June in Lake Charles, La. Hester won third place in the Magazine Small Game Hunting category for his "Doves by the Dozen" story in the September 2005 issue. He also won two photography awards, one in Small Game Hunting and another in Natural History. Both photographs, one of a young duck hunter at sunset and the other of an Eastern towhee, appeared in the January 2005 issue.

IN SEASON

This month, these seasons are open in North Carolina:

Bobcat: Oct. 16–Feb. 28.

Crow: Wednesday, Friday and Saturday of each week between June 1, 2006, and Feb. 28, 2007, plus Thanksgiving and Christmas.

Mourning Dove: Runs through Oct. 7.

Opossum / Raccoon: Oct. 16–Feb. 28.

Rails, Gallinule and Moorhen: Runs through Nov. 9.

Ruffed Grouse: Oct. 16–Feb. 28.

Squirrel (Red and Gray): Oct. 16–Jan. 31.

Squirrel (Fox): Oct. 16–Dec. 31.

White-tailed Deer: Eastern bow and arrow season runs through Oct. 6; muzzleloader season runs Oct. 7–13; gun season runs Oct. 14–Jan. 1. Central bow seasons runs through Nov. 3. Northwestern bow season runs through Nov. 10. Western bow season runs through Oct. 7, then recommences on Oct. 16; muzzleloader season runs Oct. 9–14.

Wild Boar: Oct. 16–Nov. 18

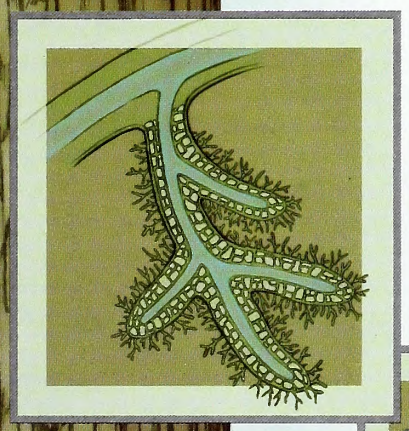
Check the *2006–2007 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit ncwildlife.org.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria, except that nutria may not be shot in Currituck County during open seasons for migratory waterfowl. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

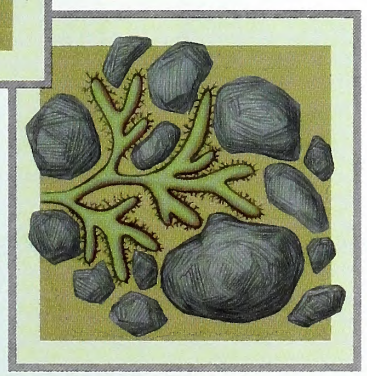
Why Do Mushrooms Grow In Rings Around Some Woodland Trees?

written by Clyde Sorenson
illustrated by Alison Schroeer

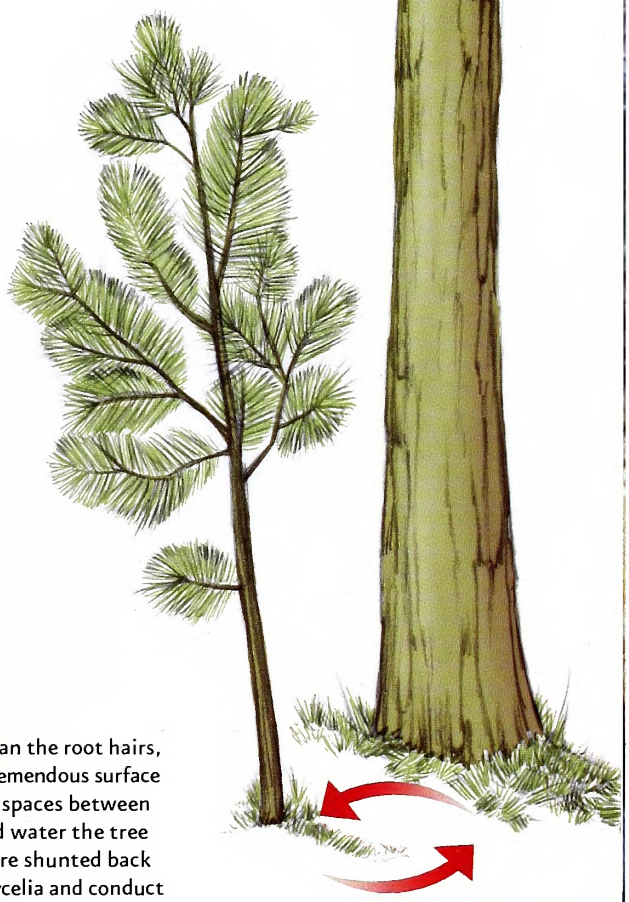
MUSHROOMS ARE SIMPLY THE FRUIT of fungi that live underground. Some of these fungi are critical to the survival of many trees. Only one to a few fungal species form these special, symbiotic relationships with each species of tree. In some cases, the fungus can't live without the tree, and the tree won't thrive without the fungus.



Fungal filaments, called mycelia, infiltrate the tiny hairs covering the smallest roots. The roots provide the mycelia with an energy source—the sugars made by the leaves far above.



The mycelia are much smaller in diameter than the root hairs, longer and far more abundant, giving them tremendous surface area. The mycelia infiltrate the myriad tiny spaces between soil particles, and harvest the nutrients and water the tree needs to survive. The nutrients and water are shunted back to the roots, which absorb them from the mycelia and conduct them to the rest of the tree.



Mycorrhizae may even transfer nutrients and energy between trees of different species. Beyond trees, most other native plants probably have some sort of mycorrhizal partner, too.

Mushrooms often grow in rings around the tree because they are typically produced on the edge of the fungal mass—so the ring of mushrooms roughly defines the extent of the tree's roots.

Angler Interrupted

written by Jim Dean

This was not supposed to be my year of fishing dangerously. The adverbs I prefer would have been frequently, widely, indulgently—and certainly—happily. After all, this would have been the first summer since my heedless childhood when I had any reasonable expectation of doing pretty much whatever I wanted to do whenever I chose to do it.

ILLUSTRATION BY JACKIE PITTMAN

"My fishing buddies have very graciously offered to continue fishing on my behalf."

Officially, I guess you would consider me semi-retired, but I like to think that I am merely taking a little time off before deciding what to do next. Besides, I am still managing a family farm and writing on occasion, although my deadlines are largely self-imposed, and my family obligations are at a manageable ebb. Thus, my plans for the summer of 2006 were narrowly focused on fishing. I am certainly familiar with the saying that "Life is what happens while you're planning something else," but I prefer to live by a famously fractured proverb uttered by my son, Scott, when he was about 6 years old. His advice was "Don't burn your chickens before the bridge hatches."

Late in May I was loading my old Bronco to go fishing when I noticed that my herb garden looked parched. As I was wrangling with the water hose, I slipped off a brick wall, snapping my right Achilles tendon. At first, there was only the stunned shock of impact and disbelief, followed by the realization that big changes lay ahead. It was a dumb accident, but are there ever any smart ones?

Just before surgery, I asked my doctor if he thought I might still be able to fly to Idaho in two weeks and at least fly-fish from drift boats. His laugh indicated he thought I was joking (denial is apparently common among recent unipeds).

As I write this in July, the miserable cast is finally off, replaced by a massive knee-high boot that permits me to hobble around with a single crutch. Even this limited mobility is a welcome improvement, but it will no doubt be a few more weeks before the boot can be converted into an umbrella stand, and months more before I am anywhere near back to normal (whatever that was).

Meanwhile, I won't be wading any rivers in Idaho and Tennessee, or hiking into any remote mountain streams in western North Carolina. My plans to sample the bass and bream populations of rivers, lakes and ponds closer to home are also indefinitely on hold. My johnboat is filling with leaves, the batteries are slowly draining on the 20-foot center console outboard I use at the coast, and the octane is dropping steadily in its tank (which I so wisely filled with $2.45 a gallon gas back in March).

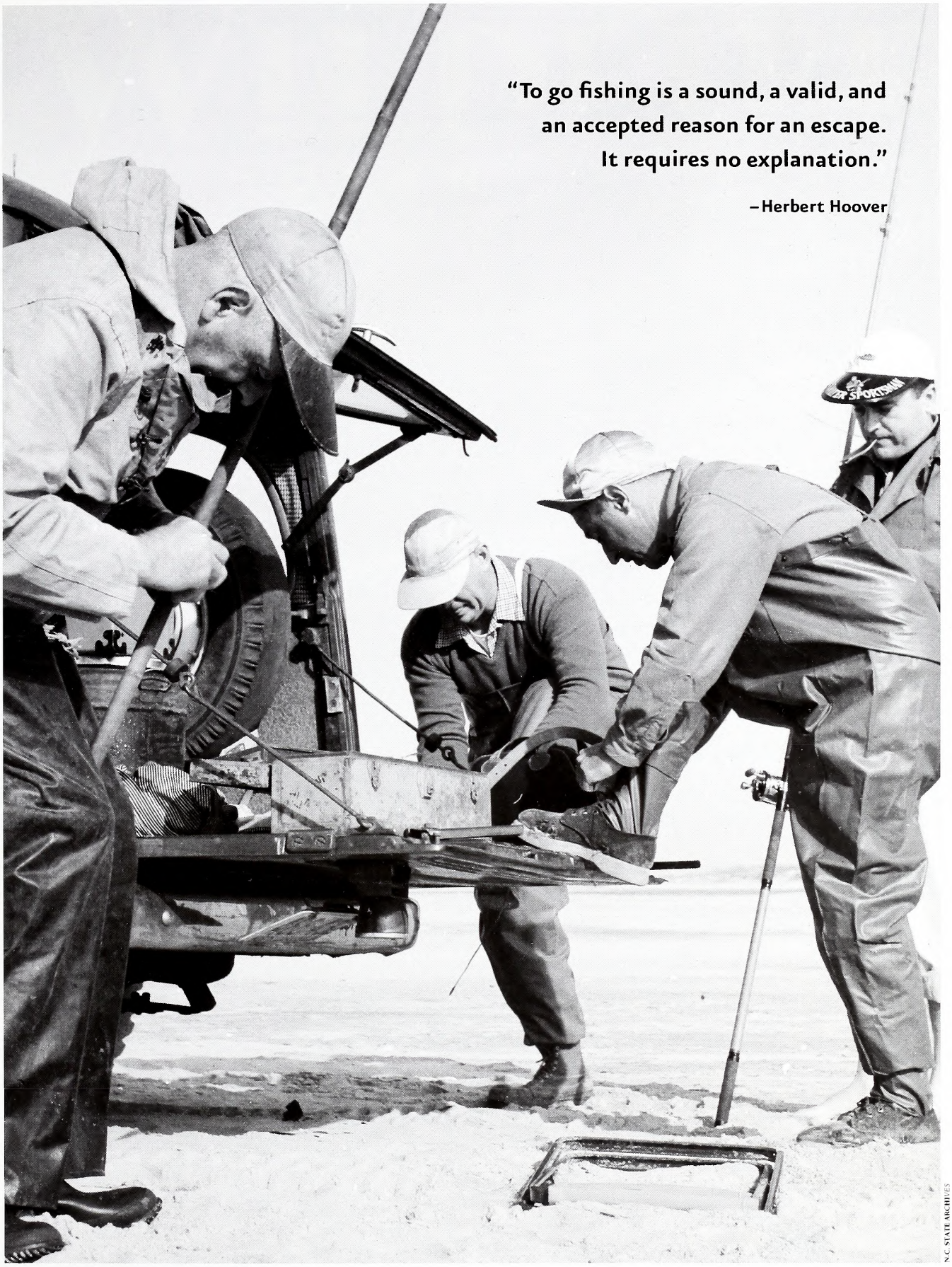
My family and friends have been sympathetic, and my fishing buddies have very graciously offered to continue fishing on my behalf. My old high school classmate, John Patronis, even pointed out that one of his distant relatives had suffered the same injury—at Troy in the Bronze Age.

There have been a few unexpected benefits. My poker game is vastly improved, my summer reading list is impressive, and I have finally proven beyond any doubt that Winslow Homer's reputation as history's foremost watercolorist is safe. Also, in early June, my now grown son, Scott, moved back to North Carolina and volunteered to take a month or so off to help me before seeking a new position as a meteorologist. He hasn't even complained.

In late July, he helped me take my first tentative steps into the edge of the surf to land a small sea mullet. He and Scott Wood have taken me fishing at the farm a few times, loading and unloading all the gear and handling the boat. There is something to be said for being dumped onto a boat seat and handed a rod and a cold brew, but I suspect that there are limits to their benevolence. It was probably not in my best interest to catch the biggest bass, nor to mention it several times later.

Having reported this with tongue partly in cheek, I'm inclined to add an obvious footnote. No matter how much whining we generate lying day after day on a sofa, it is a truly self-centered soul who does not reflect upon the countless people—perhaps millions worldwide—who are in many ways far, far worse off, and with little hope of improvement. Indeed, had I fallen in any direction other than straight down, I would have landed on a pile of cinder blocks. As one friend colorfully put it, "You coulda went missing and turned up dead."

Since we're all going to turn up dead someday, it's arguably a good thing that life's little surprises remind us how foolish it is not to enjoy each and every chicken before it spontaneously combusts.

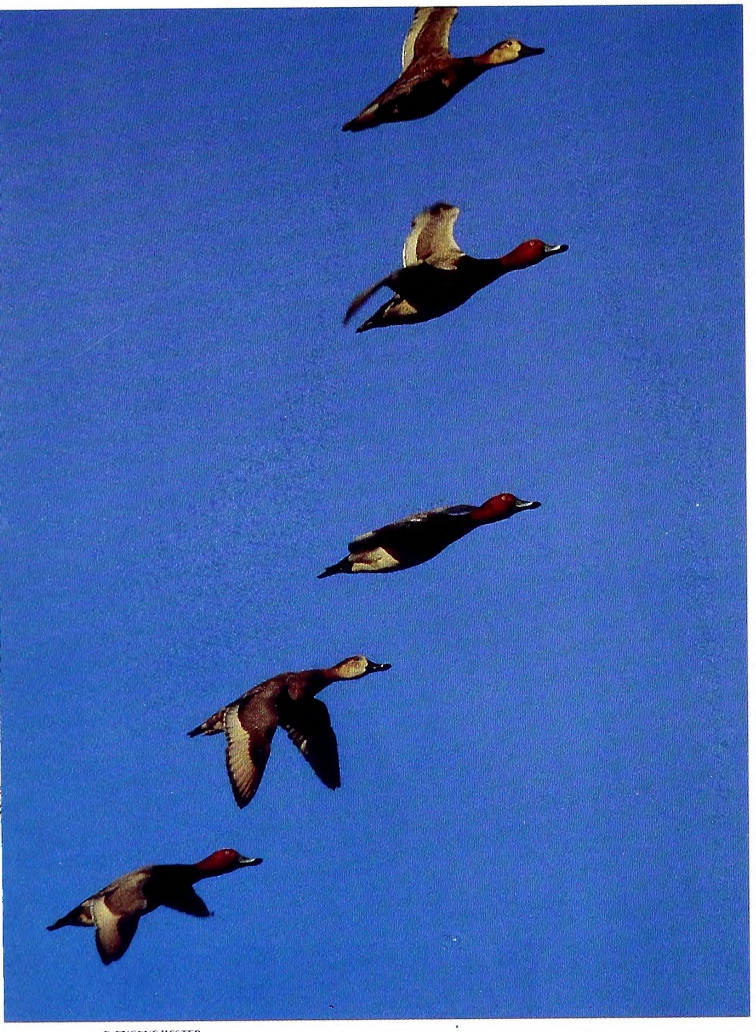


N.C. STATE ARCHIVES

Surf fishing at Hatteras, 1954

OUTDOOR MOMENT

IN THE NOVEMBER ISSUE



F. EUGENE HESTER

WATERFOWL ON THE WING
A photo feature highlights the airborne antics and unique behaviors of many of North Carolina's species of migratory waterfowl.

THEY BLUFF AND THEY PUFF
Flamboyant death-feigning and upturned snouts are only the most obvious interesting traits of little-known hognose snakes.

SALTWATER STALEMATE
Commercial and recreational saltwater fishermen have battled for decades. What will it take to bring these groups together to work for marine resources?

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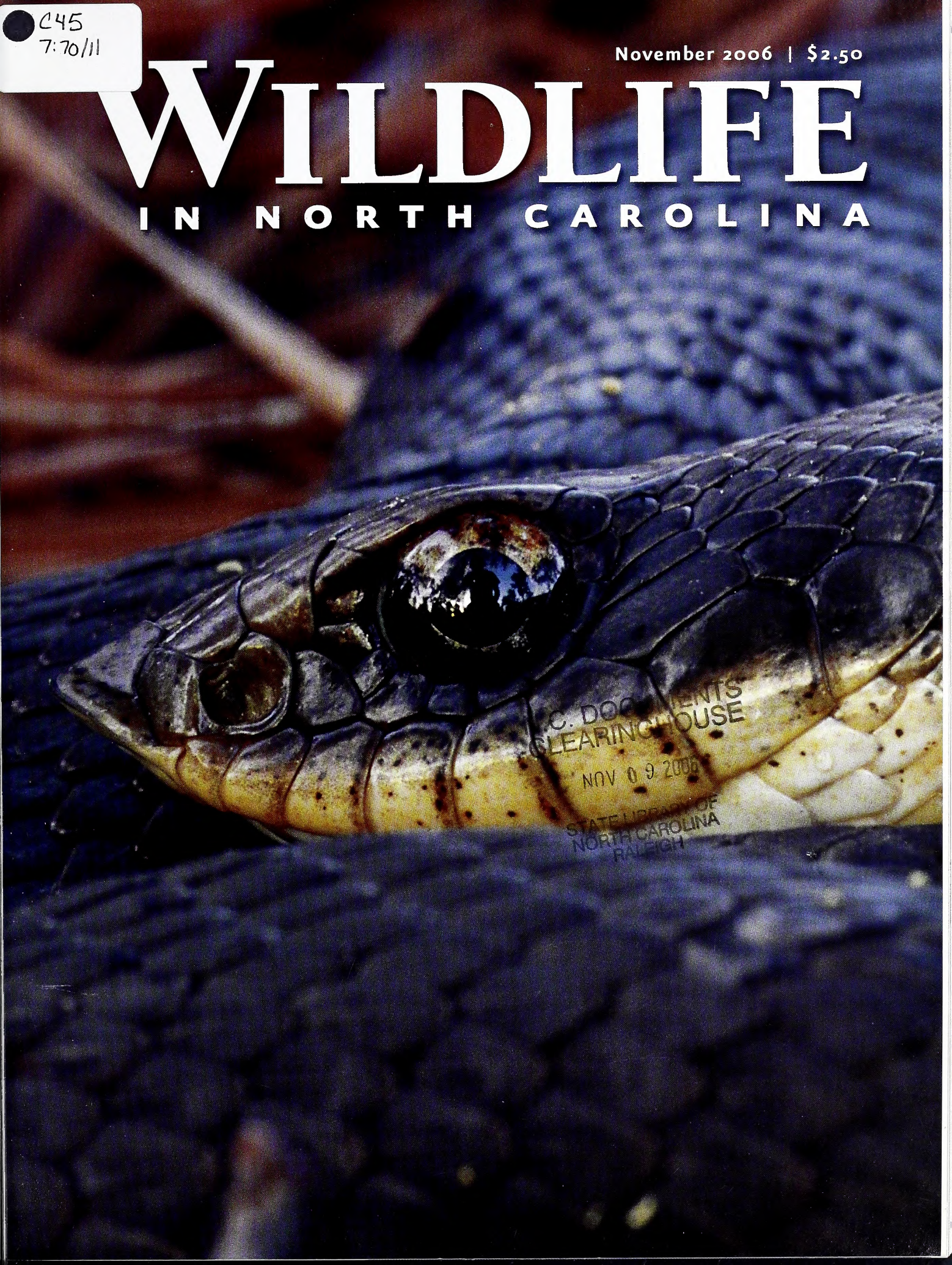
WILDLIFE IN NORTH CAROLINA



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Few waterfowl move like snow geese, which migrate to and from Canada every year and will fly miles and miles in search of food even while loafing during the winter. **PHOTOGRAPH BY F. EUGENE HESTER.**

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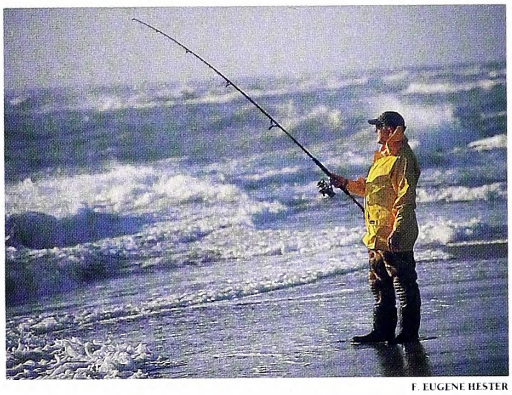
Cover: This Eastern hognose snake apparently did not feel threatened by the photographer, as evidenced by its lack of the species' trademark dramatic death-feigning display. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

It's November, which means it is time to put on waders and a slicker and stand out on a beach in the cold rain. If this doesn't sound appealing, then you probably have never tried it while holding a long surfcasting rod baited with fresh mullet. Or maybe you just aren't into that kind of fishing. If that's the case, you don't know what you're missing.

Mid-autumn is the best time of year for surf fishing on the Outer Banks. Anglers come to Cape Hatteras from all over the East Coast to take part in a pastime that is part solitude and part spectacle, depending on the vagaries of weather, current and the shifting of the Diamond Shoals. If conditions are right, anyone with a decent rod and reel and a couple of lures can fill a cooler with puppy drum, croakers, flounder, spot, pompano and striped bass. A four-wheel drive vehicle is handy if you don't want to lug your gear from the highway down to the water, and it can provide shelter if the weather turns really ugly.



F. EUGENE HESTER

Because sun-loving tourists are long gone, a fall fishing trip to the Outer Banks can be spent almost entirely alone, if that's what you desire. With luck, it's possible to have a bluefish blitz all to yourself, pulling in monster 15-pound chopper blues on a simple spoon rig. Or you can stand shoulder-to-shoulder with the dozens of other diehards at Cape Point, where waves smash into one another dramatically and huge 30-pound red drum cruise the shoals in pursuit of baitfish.

For these reasons and many others, saltwater fishing is important to a lot of people. That's why we dedicated stories in the two most recent issues to the new Coastal Recreational Fishing License ("License to Manage," Oct. 2006, and "Coastal Tension," page 4). Enjoy the fishing this fall, and remember to visit ncwildlife.org to purchase a saltwater license before any fishing trips in 2007. In part, your money will go toward making sure surf fishing on the Outer Banks continues to be great.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

NOVEMBER 2006 VOLUME 70, NUMBER 11

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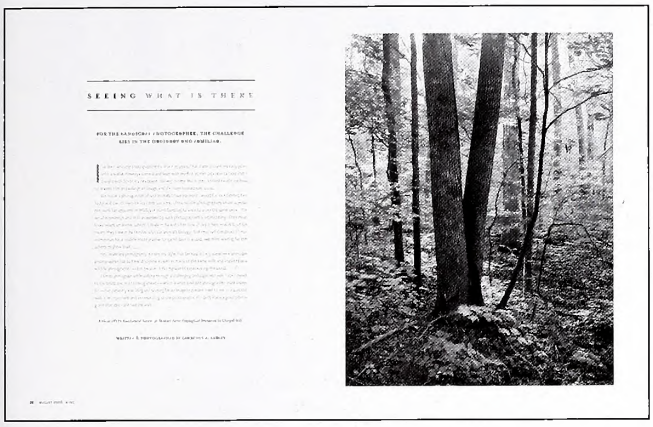

Be Careful with Cattle

First, let me say thanks for the great work with the magazine, it looks great and is interesting. Having worked for the N.C. Wildlife Resources Commission for 34 years as fisheries biologist, permit reviewer and Watershed Enhancement Supervisor, I am a little disturbed with the picture on pages 28–29 in the August issue showing a tranquil mountain scene, complete with creek and cow ("Seeing What Is There"). Those of us in the Division of Inland Fisheries, and especially in the mountains, know that one of the most damaging habitat issues to our streams is livestock access. Livestock trample stream banks; this increases bank erosion, reduces or eliminates stream riparian vegetation, adds unneeded nutrients to many streams, and in general degrades streams to which they have access.

It is somewhat disturbing to me that *WINC* would publish a picture that promotes cattle access to N.C. streams, especially cold water mountain streams, when livestock and the associated land clearing that is needed for pastures is one of the biggest pollution/ongoing sedimentation problems to our streams. As an agency, we need the magazine to promote good land stewardship and riparian protection and not give the general public the idea that cattle should have stream access. Thanks for your consideration to this sensitive issue for future pictures in the magazine.

Joe Mickey
NCWRC Watershed Enhancement Coordinator
Elkin

Delicious Doves

While reading the Sept. 2006 issue, I was especially interested in the article about mourning doves ("Birds in the Hand"). The Labor Day weekend dove hunt has been a tradition in my husband's family for at least as long as I have been his wife—35 years. I send him out each year with the admonition to "bring back 24 birds if you want pie." It has become more and more difficult for my husband and his brothers and hunting buddies to bag a total of 24 doves between them, but when they do, I have a recipe that yields tasty pot pies for all of them. If you would like to try this tasty fare, use the recipe below or modify it to suit your own family's taste. Thanks for your informative magazine. I read it cover to cover each month in our school library at Beaufort Elementary.

Dove Pie
24 doves
1/4 cup granulated chicken bouillon
1 tsp black pepper
1 tbsp cooking oil
4 cans Campbell's Creamy Chicken Mushroom Soup
4 cans Veg-All mixed vegetables, drained well
3 deep dish pie shells
3 sheets of pie pastry

Remove all shot and feathers from the doves. In a large covered stock pot, cook the birds on medium heat, in just enough water to cover, plus the bouillon, pepper and oil. When tender and cooled enough to handle, separate the meat from the bones and reserve the liquid.

In a large bowl, combine the meat, cans of soup and vegetables. Rinse out the soup cans with 1/3 cup of the dove broth. If a less soupy pie filling is desired, you may mix some of the broth with cornstarch to form a thickener and add that to the mixture.

Divide the meat mixture among the three pie shells. Top with a piece of pie pastry and fold the top crust under the edges of the bottom crust. Crimp with the tines of a fork all the way around. Cut vents or slashes in the top crust. Brush with melted margarine if desired. Bake at 350 degrees for 45 minutes. Cover with foil so crust doesn't get too brown, and continue to cook for another 15 minutes or so until filling bubbles out of vent holes. Allow to cool before slicing. Enjoy!

June Garner
Beaufort

Grounds for Advice

To Jim Dean (re: "Camp Coffee," Sept. 2006): Combine coffee and water in a pot. Heat to simmer for a few minutes and take off fire. Let it sit for a minute and add a cup of cold water. Let it sit for a couple of minutes, and if some idiot doesn't shake it up or put it back on the fire, you'll have the best cup of coffee ever and you can drink it right down to the mud without having grounds in your cup.

Ken Fuller
Deep Gap

Jim Dean: Thanks for the camp coffee tip, Ken. I will surely try this, but given my history in such matters, I believe you are perceptive to add that "some idiot" could still make a botch of it.

Needling Question

I enjoyed the story "My Longleaf," by David S. Lee (Sept. 2006). I know I'm not the sharpest thorn on the bush, but aren't there a lot of loblolly pines in the accompanying photograph?

Dean Ab-Hugh
Southport

Probably not, Dean. The photo on the opening spread of the story was taken at Holly Shelter Game Land in Pender County and was used for illustrative purposes. The trees pictured are on a tract that is carefully managed for longleaf. However, they are not old enough to display the unmistakable longleaf look that older, more mature trees have, and they do look quite a bit like loblollies.

write us

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COASTAL Tension

In the struggle for fisheries resources, can North Carolina's commercial fishing culture survive?

WRITTEN BY JIM WILSON

Last summer, a North Carolina newspaper story depicted a scene that must play out hundreds of times each year. Two recreational anglers are sight-casting to tailing red drums when they see a couple of commercial fishermen setting a gill net at the entrance to a creek.

One sport fisherman remarks that most states on the Atlantic coast have banned the use of gill nets in estuaries. "North Carolina is behind the times when it comes to gill nets," he says.

"I don't think we should have any entanglement netting in the sounds at all," his companion responds.

That coastal vignette delineates a tension that exists between some members of the commercial and recreational sectors. The sport fisherman thinks the commercial man is pillaging the resource by netting. The commercial fisherman thinks the only reason the recreational guy complains about his use of nets is that the sport fisherman wants more fish for himself. Tempers have flared occasionally between commercial fishermen and recreational anglers in our state, resulting in claims of cut nets and slashed tires. Often the tension is restricted to grousing, grumbling or angry words at N.C. Marine Fisheries Commission (MFC) public meetings.

That animosity is a relatively new thing. A century ago, most people fished for sustenance or commerce, not sport. Over the past few decades, though, as leisure time and disposable income have increased, more people have fished purely for recreation.

Too, the population of the coast has changed. Between 1970 and 2000, the 20 coastal counties experienced a population increase of 62 percent overall, with Dare County, home to Nags Head and Hatteras, leading the way with a 328 percent climb. Add to that the millions of people who vacation in those counties, and it is easy to see why the sleepy little fishing towns that dot the landscape no longer slumber. Most of those new residents and visitors have little knowledge of commercial fishing or the men and women who scrape out their livings from the sea.

By the nature of his work, Britt Shackelford, a charter boat skipper who runs Doghouse Fishing out of Hatteras and Wanchese, earns his living from fishing, but he also deals with recreational fishermen on a daily basis. In 2005, Shackelford was one of the founders of North Carolina Watermen United, a trade association for people who make their livings off the water. Like other captains who take sport anglers out for a day on the water, Shackelford said he hears the complaints about commercial fishermen.

JOEL ARRINGTON

JOEL ARRINGTON

This placid scene on Broad Creek in Pamlico County belies the tension that exists between beleaguered commercial fishermen and recreational anglers.

"We'll be up on the bridge and they'll see guys with nets and say, 'That's why we can't catch more fish. Those commercial guys are catching too many.'

"So I'll talk to them about what the commercial guys are doing, show them the guy's boat and gear when we get back to the dock, explain what's going on. A lot of times, they end up wanting to buy some of his fish."

NATE BACHELER

A Threatened Culture. Unfortunately, creating goodwill among those two user groups often is not so painless. The commercial fisherman in North Carolina, and every other part of the country, faces an increasingly difficult life. His existence, in fact, is threatened. He is intensely regulated by state and federal governments and faces competition from foreign markets, which provide much of America's seafood. (Imports account for 75 to 80 percent of the seafood consumed annually in the United States.) Fish houses are disappearing, leaving the commercial fisherman with fewer options for selling his catch. Boat slips, too, are losing out to development and have become too expensive for any but the well-heeled to buy. In some places where growth has been the greatest, fishing families have a difficult time even paying property tax on their houses and land, particularly since the average ex-vessel receipts for a commercial fisherman in North Carolina were just $18,736.85 in 2004. A fishing culture that has existed for centuries is under fire daily from an array of threats, with no relief in sight.

In 2005, the N.C. Division of Marine Fisheries (DMF) counted 3,980 active commercial fishermen, who made 155,112 fishing trips with landings of 79,162,659 pounds, the lowest catch in state history. Just five years prior, 5,031 active commercial men made 259,746 trips and landed 154,229,116 pounds

of fish. Conversely, the estimated number of recreational anglers has grown from 1,921,780 in 2000 to 2,360,712 in 2005. Their total catch—approximately 22 million pounds—and trips—about 6.5 million—were nearly the same in 2000 as in 2005, although there have been fluctuations in the intervening years.

To the commercial fisherman, North Carolina's new Coastal Recreational Fishing License (See "License to Manage," Oct. 2006), which takes effect on Jan. 1, 2007, seems like another assault on his way of life. The commercial harvesters are wary of the license for several reasons.

Jerry Schill, the former president of the N.C. Fisheries Association, a nonprofit trade association created by commercial fishermen in 1952, was fighting the recreational license as long ago as 1993. That's when Schill heard a spokesman for the Coastal Conservation Association (CCA) of North Carolina, a prominent sportfishing organization, tell a public forum in Raleigh that the license would give recreational fishermen a powerful voice.

"The way the license was presented was not for data; it was to create an avenue that the money could be used against the commercial fishing industry," said Sean McKeon, who replaced Schill in June 2005, almost a year after the licensing bill was adopted.

"I think that the primary problem we had with the license was if it was ostensibly to collect data to better enable us to manage the resource, both recreational and commercial, then it should be all-inclusive and not have all the carve-outs, not have all those people not participating," McKeon said. "Charter and head boats are carved out now; so are the piers. That really was the reason—and comments by others that it was going to be money used against the commercial fishermen. We were against it right up until the time it was passed. Reality being what it is, we didn't make a big stink over it at the last. Everybody knew where we stood."

Owners of charter boats and head boats can purchase a vessel license that eliminates the need for each fisherman on the boat to be licensed. Piers can purchase a blanket license, the cost of which is based on the number of linear feet of the pier. One of the benefits of the license for DMF is that the agency will have excellent data on the number of recreational anglers and the impacts they are having on fisheries.

Some commercial harvesters feared that because the license will produce a list of recreational anglers, that information could be accessed by groups opposed to commercial fishing. However, the N.C. Wildlife Resources Commission, the agency that will sell the licenses, is forbidden by law from disclosing personal information, including an angler's name, telephone number and address, to anyone except government agencies that have a need for the information.

MELISSA McGAW

The numbers game. Fisheries managers already know that recreational saltwater fishing, through the sheer numbers of participants, plays a larger economic role than commercial fishing. Exactly how great an economic impact those anglers have is unclear, and will remain so until the recreational license goes into effect. Estimates of recreational expenditures are many and vary wildly. Perhaps the safest estimate comes from the U.S. Fish and Wildlife Service's 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation. That survey showed close to 700,000 recreational saltwater anglers spent $246,155,000 that year in North Carolina. For the year 1999, however, the National Oceanic and Atmospheric Administration had estimated direct expenditures of $622,641.

MELISSA McGAW

For hundreds of years, families in eastern North Carolina have built their lives and communities around what they harvest from the sounds and ocean.

It should come as no surprise that all those recreational anglers also can have a big impact on fisheries. Sport fishermen have higher harvests than commercial fishermen on more than a dozen finfish species. Sometimes the harvest is dramatically higher, as in the case of striped bass, yellowfin tuna and dolphin.

"We know that the impact is pretty great now," said DMF director Preston Pate. "I think once we get that documentation, we'll be able to convey not only the level of impact on the resource but also the level of contribution to the economy of the recreational fisherman much more clearly and accurately to the public."

Even knowing the larger economic role of recreational fishing leaves hanging this question: Should

access to resources or allocation of fisheries be based on the economic vigor of one user group versus another?

Historically, economics usually wins. Most states with a recreational saltwater license — and that includes every state from Texas to Maryland on the Gulf of Mexico and Atlantic coasts — have placed new restrictions on commercial fishing. Soon after instituting a saltwater license, Florida banned most commercial fishing nets through a ballot initiative. Texas, Louisiana, South Carolina and Georgia, among others also have some form of gill net ban. In the early 1980s, Texas, spurred by Exxon heir Walter Fondren III and the nascent CCA (then known as the Gulf Coast Conservation Association), passed legislation banning the commercial catch of red drum and spotted seatrout in its waters and forbidding the sale of either wild-caught species in the state. By the end of the 1980s, commercial fishing for red drum in all federal waters in the Gulf of Mexico ended.

NATE BACHELER

Commercial and recreational fishermen target many of the same species. For the various species of grouper, the two groups combined landed more than an estimated 900,000 pounds in 2005.

2005 Recreational Harvest Greater Than Commercial

Species	Recreational Pounds	Commercial Pounds
Cobia	383,074	17,886
Dolphin	5,052,981	141,365
Red Drum	236,754	128,770
Black Drum	168,800	44,987
King Mackerel	1,296,726	1,246,092
Pigfish	146,672	30,015
Pompano	73,188	6,519
Spotted Seatrout	624,076	129,595
Sheepshead	207,221	53,259
Striped Bass	2,213,745	848,178
Yellowfin Tuna	5,510,876	708,736
Wahoo	464,884	14,980

Will North Carolina be any different in terms of further restrictions on commercial harvesters? Some recreational anglers would respond that we cannot have both a good recreational fishery and a good commercial fishery. "That's a foolish statement," McKeon said. "It's based on the lowest common denominators of the human spirit, and they're avarice and greed. I think for a man to insist that his pleasure take precedence over another man's livelihood is very arrogant and a very foolish thing to say."

If the commercial versus recreational situation plays out differently in North Carolina, it could be because of the Fisheries Reform Act of 1997.

Room for all? "What I've been explaining in the debate over the saltwater fishing license has been the legal requirement of the legislative mandate that we work under, and that's the Fisheries Reform Act," Pate said. "That very clearly says that the fishery resource will not be managed to the exclusion of one group or the other."

The Fisheries Reform Act revamped fisheries management in North Carolina. One of the crucial pieces of that legislation was that DMF was directed to write Fisheries Management Plans (FMPs) for all significant commercial and recreational species and to review those plans every five years. The act also acknowledged the importance of both commercial and sport fishing, and directed that DMF must consider both user groups in its management decisions.

"I have to answer these questions almost every time I make a presentation to a group that is primarily recreational anglers," Pate said. "'Why does North Carolina still allow shrimp trawling inside? Why does North Carolina still allow the use of gill nets inside?' I explain that in the states where that gear has been banned, it has not been because of biological assessment of damage to the stock. It's been caused by purely political reasons. In the state of Florida, there was enough political juice by the recreational anglers to get the commercial fishermen kicked out of certain aspects of that fishery. Texas was the same way."

The imbalance of the numbers, of both fishermen and economics, scares the commercial sector, Pate said. "My response to their fear of that imbalance is that the recreational fishing license is not going to cause that imbalance; it's there already. People, politicians, managers already know there are more recreational anglers than there are commercial fishermen. What you'll have is a better accounting of them. There may be some reality or some legitimacy to their concern that those anglers, now that they are paying

for the privilege to fish, might demand a louder voice and more say in the management process. More than that, what they interpret is a cause-and-effect relationship between a recreational fishing license being approved in a state and shortly thereafter a ban on commercial fishing or certain components of commercial fishing."

Pate noted that a plethora of gear restrictions for commercial fishermen already exist. They are not allowed to trawl for shrimp in areas that once were open; large-mesh gill nets are banned in Pamlico Sound because of sea turtles; bottom-disturbing gear is prohibited in areas of submerged aquatic vegetation and primary and secondary nursery areas; and flynets are banned south of Cape Hatteras. Last summer the MFC closed the Pamlico and Pungo rivers to shrimp trawling because of excessive bycatch mortality of juvenile Southern flounder. Those restrictions and more are in place without a saltwater license.

Fair and equitable treatment. McKeon said the Fisheries Reform Act has made it clear that both the commercial and recreational sectors have to work together. "I think the spirit of that act is that the sectors should be treated fairly," he said. "At the end of the day, the bottom line of that act was: 'Y'all are here, y'all are fishing side by side, you're going to get along. This is what we're going to put in place so you will get along. We're going to facilitate the management of those fisheries to be fair and equitable.' I think that particular reform act is the mechanism that says you're going to get along whether you like it or not."

Some recreational anglers do not like fishing side by side with commercial fishermen. Last summer, one North Carolina writer called for a net ban as the only way to ensure top-quality recreational fishing in our state, particularly for red drum. "He doesn't care that there are hundreds and hundreds of families who would lose their jobs and go out of business," McKeon said. "That's not a concern of his. His concern is a thriving recreational fishing industry, which means fishing how and when and where he wants.

MELISSA McGLW

Globalization of seafood markets strikes hard

One of the ironies of commercial fishing is that although the total United States harvest has remained static for 15 years, Americans are eating more seafood each year. Spurred by reports of the health value of seafood, our annual per capita consumption of fish and shellfish has risen to nearly 17 pounds. The bulk of that seafood, about 80 percent, is imported, primarily from Asia. Those imports give the United States a trade deficit of more than $7 billion in that commodity.

Shrimp, imported from such countries as China, Thailand, Vietnam, India, Ecuador and Brazil, are America's most popular seafood and constitute about 34 percent of the total United States imports. America imports about 1 billion pounds of shrimp each year just from those six nations, and we each consume 4.2 pounds of shrimp annually. Add salmon and crab, the other two most popular imports, and those three products account for about 54 percent of United States annual imports.

"The globalization of our economy and seafood industry is a real threat to the health of the commercial fishing industry, and it's not just North Carolina," said Preston Pate, director of the N.C. Division of Marine Fisheries (DMF). "The low price of imported seafood products, including shrimp and crabmeat, and to a growing extent some of the farm-raised species such as flounder, that are coming onto the market is something our domestic wild harvesters cannot compete with."

Between 2000 and 2004, Americans' per capita consumption of seafood rose about 1.5 pounds. It was no coincidence that cheap imported shrimp and other seafood began appearing in American stores at the same time. The effects on the shrimp industry showed up quickly. In North Carolina, commercial fishermen landed 10.3 million pounds of shrimp worth $25.5 million in 2000. Five years later, they caught only 2.4 million pounds, and the value fell to $4.4 million. The U.S. International Trade Commission levied antidumping duties on the farm-raised shrimp of six nations (Thailand, China, Vietnam, India, Ecuador and Brazil) early in 2005 because those countries were selling shrimp below the price it cost to produce them. Nevertheless, the trend of increased imports from those countries has not abated. By last June, total United States shrimp imports were running 11 percent higher than in 2005.

Shrimp are considered an annual species. They reach maturity within a year, have high spawning and mortality rates, and few live beyond one year. In North Carolina, there are three primary species: brown shrimp, usually caught from July to November; pink shrimp, harvested from April to June; and white shrimp, caught from August to November. For decades, North Carolina fishermen have turned to shrimp to help put food on their families' tables. Making money off shrimp, however, has become more difficult as the ex-vessel price, the price paid to the fishermen, has fallen. The 2005 average was $1.87 per pound.

"We had one of the worst shrimp landings on record last year," Pate said. "The recruitment was bad, but not as bad as the landings reflected. The landings were low because a lot of the traditional shrimpers were up off New England and New Jersey scalloping. They could go up there and do their day trips and catch 10-dollars-a-pound scallops burning the same amount of fuel that they would to chug around Pamlico Sound and catch 50-cents-a-pound shrimp. If you can't do the math on that, you ought to stay home.

"I think that's a sign of the future. What that is perpetuating is that when the ability or the opportunity to harvest declines, you lose your infrastructure that supports the industry."

Perhaps nowhere is the loss of that infrastructure more vivid than in our state's crab-picking houses, which have declined from an all-time high of 43 facilities to just 12. "When the imported crabmeat hit the country 10 years ago, it had a devastating effect on our crab-picking houses in North Carolina," Pate said. "Cheap labor and cheap product available to the foreign picking houses put product on the domestic market that there was just no way our domestic pickers could compete with."

The harvest statistics for hard blue crabs, a staple of the North Carolina commercial industry, tell a story similar to that of shrimp. In 1996, fishermen harvested 65.6 million pounds of the shellfish. In 2005, the catch was only 23.6 million pounds. As the market for picked domestic crab meat atrophied, North Carolina fishermen responded by taking advantage of the increased value in live crabs, primarily the big males that are called basket crabs.

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JOEL ARRINGTON

Whether by head boat, on the beach or from an offshore charter, recreational anglers make substantial impacts on North Carolina's economy and its fish resources.

F. EUGENE HESTER

JOEL ARRINGTON

"Certainly most of our guys are recreational fishermen when they're not commercial fishing. There is an element that would like to see nothing more than the commercial man in North Carolina go out of business, and I think that's sad. I've never heard a commercial fisherman—and I've been in some pretty heated discussions with my colleagues behind closed doors—ever talk about putting recreational people out or not having recreational fisheries."

Will Morgan, executive director of CCA North Carolina, said there should be room for both user groups in North Carolina. "CCA has some extremists at either end of the spectrum," he said. "Fishermen are stubborn. Each of us thinks he knows the best way to do something.

"Ultimately, I hope we can have both a good recreational fishery and a good commercial fishery," he said. "We want what's best for the resource. We want whatever science tells us it needs. That can't do anything but help. If it affects one group more than the other, even if it's recreational fishermen, as long as it is good for the resource, then that's what CCA would support."

In an effort to get the two user groups talking to one another, commercial fishermen and recreational anglers are brought in on the ground floor when biologists prepare FMPs. Representatives of both groups serve on advisory committees that report to the MFC. "The way commercial and recreational issues have been addressed in the past gets to be an all-or-nothing situation," Morgan said. "All-or-nothing shouldn't always be the case."

Walter Fondren, who has called a recreational license "a weapon to level the playing field" with commercial fishermen, and McKeon, the commercial fishermen's representative, have a common view as to the most critical element in the struggle between the two fishing interests.

Politics hold key. "Capt. Will Etheridge said it better than anybody else: It comes down to the elected officials," McKeon said of the late Dare County fisherman. "We can complain about managers, NMFS (National Marine Fisheries Service), the commissions, the councils; but at the end of the day, unless the elected officials, both those in-state and our congressional delegation, take up this issue and put commercial fisheries on the agenda, on the radar screen, the future is dire. It's every bit as dire as it was in Florida, Georgia, South Carolina and other places in the Gulf. The key is the elected officials have to understand that without their aid, their help and

commitment to the industry, the industry does not have a bright future. We have made some good progress in bringing some of these issues to our congressional delegation, particularly our senators."

Fondren, the chairman of CCA, has written very succinctly on the matter: "The real power in this battle is political."

As a manager, Pate, who will retire from DMF on Feb. 1, 2007, takes the words of the Fisheries Reform Act seriously. "We've approached the problem from this standpoint: If a user group is excluded, then we may have failed in our management approach as required of us by law. We want to keep habitat with enough integrity and the stocks healthy enough so that the traditional fisheries, both commercial and recreational, can be maintained. If it gets to the point where we have to exclude one user group from participating in the fishery, that's going to be a sad day for me as a fisheries manager, because I don't think we will have done a very good job by the time we get to that point."

After having served more than nine years as DMF director, Pate realizes that the strictures of that fisheries legislation are not immutable. "That's not to say that sometime in the future the political pressures might not become strong enough to make a change," he said. "And that's not to say that some time in the future we not might find legitimate biological reasons for completely eliminating some form of fishery. There are a lot of restrictions in place, and there are probably going to be more in the future that respond to the needs of the resource to help maintain the health of that resource, and not political needs."

In 1969, the Stratton Commission delivered a report on the state of our nation's seas, coasts and their resources to the U.S. Congress. That commission believed, erroneously, that seafood harvests would continue to grow as fishermen tapped new species with more sophisticated technologies. The report noted the following about commercial fishermen: "Fishing is an ancient business, and its practitioners often are less concerned with economic efficiency than with the simple fact of making a living from the sea."

Fishing is, indeed, an ancient business. Throughout history, men and women of countless cultures have fed themselves or earned their livings from the bounty they could harvest from the sea. In North Carolina, early European explorers found the Algonquians of the Coastal Plain very adept at fishing. The colonists also grew proficient at fishing, and began a proud, hard-working, community-based culture that has existed for more than 300 years. What remains to be seen now is how much longer that culture and tradition will continue. ◆

Jim Wilson is associate editor of WINC.

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The crabs are shipped to Baltimore, Boston and other cities along the Atlantic coast. Commercial harvesters also increased their catch of soft crabs.

That strategy, however, went awry late last summer. "What's happened now is that, with Hurricane Katrina destroying the crab-picking facilities in the Gulf [of Mexico], the live crabs that were being brought to those picking houses before the storm are now being trucked up to New England and Baltimore for the live-crab market," Pate said. "Chesapeake Bay is having a fairly decent year, so they're putting live crabs on the New England market. Our fishermen essentially don't have anywhere to send their crabs. So even if we were to have a banner year in recruitment and production of blue crabs, the market conditions are so bad that the fishermen are not going to fully benefit from the improved harvest. That just underscores the lingering, long-term effects imports can have on the infrastructure supporting a fishery."

American harvesters once supplied the bulk of shrimp consumed in this country, but now that percentage has dropped from approximately 90 percent to about 20 percent. With the number of commercial fishermen falling, few young people entering the profession and the loss of infrastructure throughout the industry, American fishermen simply cannot supply this nation's demand for seafood, 40 percent of which is supplied by aquaculture.

"There's no way, even without the imports, that the domestic harvest can satisfy the needs of the consumer for shrimp, so we're going to have to continue to rely on imports to meet those demands," Pate said. "What the fishermen are trying to do — some of them being successful in this — is develop niche markets, create a better awareness in the consuming public of the quality of the domestically harvested seafood, in flavor, in texture and in not being full of chemicals like farm-raised products are, so that it can continue to command a high and even higher price."

That is what is happening in Down East Carteret County right now. A number of disparate groups started a program called Carteret Catch to promote seafood caught by local fishermen. Carteret Catch had its origins as part of the Rural Community College Initiative, a program funded by the Ford Foundation that helps rural communities become competitive in changing economies.

Carteret Catch has brought together not only commercial fishermen and seafood dealers but also N.C. Sea Grant, the Core Sound Waterfowl Museum and Heritage Center, DMF, the National Oceanic and Atmospheric Administration, and academic institutions such as N.C. State University, Carteret Community College and N.C. A&T University. One of the aims of the program is to inform the public that commercial fishing in North Carolina produces a high-quality, sustainable product.

"Studies have shown time and again that people want to support local products," said Pam Morris of the Core Sound Waterfowl Museum. "Give them the option and they will support local people and quality seafood."

Morris said Carteret Catch does not want restaurants to serve only local seafood but to emphasize the local catch as different, another option on the menu. "Even if we wanted to have everybody in Carteret County eat nothing but local seafood, we couldn't do it. We can't catch that much shrimp."

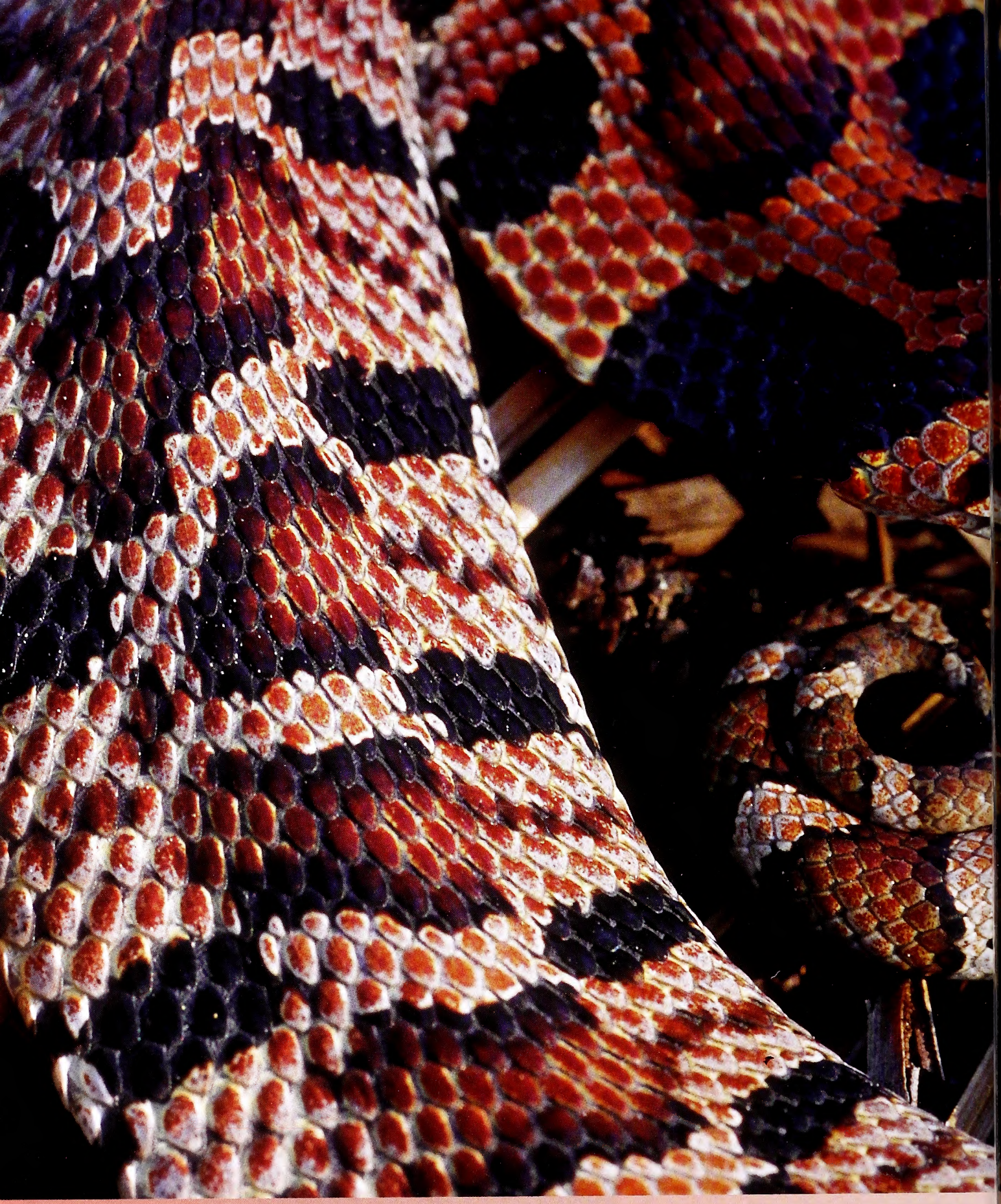
The program is more about finding a niche that local fishermen can fill. "It's going to take thought and will," said Morris, whose husband is a commercial fisherman. "It's a problem you can't just throw money at. Like other places, we're in danger of losing our fishing industry. We're on the point of a knife really.

"The general idea is that we can't survive in a global market. Commercial fishing has to start selling itself differently. I believe we'd receive an F on the education of the public as to local seafood. We would like to develop partnerships between fish houses, restaurants and fishermen. We want to help fishermen remain viable economically. Right now we still have a living culture, but you can't keep heritage going without economics."

Several factors have come together to make commercial fishermen's lives harder than normal and accentuate the need for a program like Carteret Catch. The ex-vessel price of shrimp is low — about $2 a pound for the large 16 to 20 count shrimp last summer, less for smaller shrimp — the cost of diesel fuel is high — about $2.50 per gallon — and the lingering effects of a series of devastating hurricanes has hurt shrimp populations.

"All of it together is equaling to a hard time," Morris said.

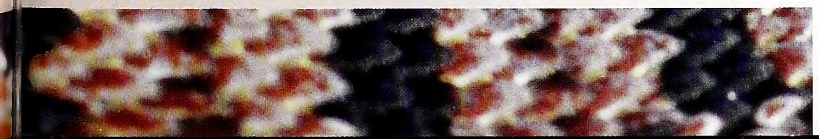
–Jim Wilson



Upturned noses and spectacular defensive chicanery are just the beginning of a long list of unique features

Hatchling Eastern hognose snakes are boldly patterned and colored. Adults frequently grow darker and lose their pattern.

shared by North Carolina's two hognose snakes.



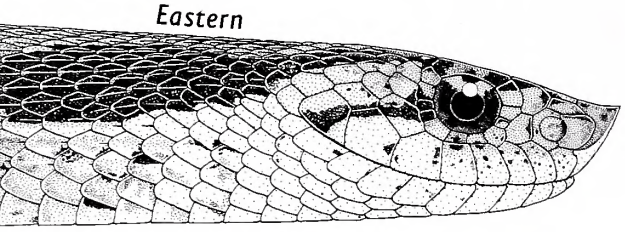
A TALE OF TWO SNOUTERS

WRITTEN BY JEFF BEANE
PHOTOGRAPHED BY TODD PUSSER

AT 95 DEGREES, with humidity somewhere upwards of immeasurable, I was still glad to be on the Sandhills Game Land. Save the distant song of a die-hard indigo bunting, a nighthawk's occasional dive boom and the soft (and far more frequent) buzz of a deerfly in my ear, the only sound amid the oppressive heat and stillness of the longleaf savanna was my receiver's repeated "blip," which suggested that my subject hadn't moved from the burrow where he'd spent the past month.

I crossed the remaining hundred yards of wire grass and poison oak anyway, knowing that a certain patch of sand and turkey oak leaves concealed an estivating adult male Southern hognose snake that had been surgically implanted with a tiny, temperature-sensitive radio transmitter nine months earlier. I scribbled down the time, air and soil temperatures and other pertinent information. With a stopwatch I counted pulse intervals, from which I could later calculate the transmitter's (and thus the snake's) temperature—a few more data points that I hoped would contribute to the meager body of knowledge on the natural history of a very poorly understood animal.

ILLUSTRATIONS BY RENALDO G. KUHLER, COURTESY OF THE N.C. MUSEUM OF NATURAL SCIENCES



PARIS TRAIL

Above, from top: Some color variations of the Eastern hognose — gray with some pattern remaining, black and blotched.

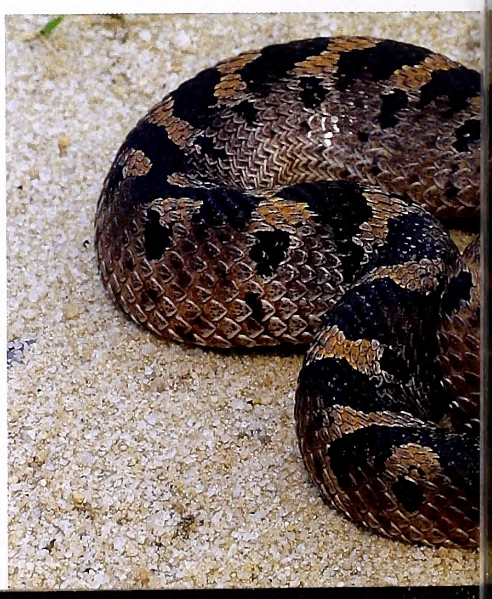
Had Nature not hit upon hognose (also spelled "hog-nosed") snakes first, Dr. Seuss might have. Their common name derives from their wedge-shaped rostral scale, which they use for digging and which gives them a pug-nosed appearance. The generic name, *Heterodon*, is Greek for "different tooth." This references the pair of enlarged teeth in the rear of their upper jaw (sometimes called "toad-poppers"—more on that later). Of the three (some authorities say four) North American species, two occur in North Carolina.

The Eastern hognose snake, *Heterodon platirhinos*, is by far the more common, conspicuous, widespread and well-known of the two, ranging over much of the eastern and central United States in a wide variety of habitats. It occurs throughout most of North Carolina, excluding the highest mountains, but is most common in the Coastal Plain. Colorwise, Eastern hognose snakes may be our most variable snake species. Hatchlings are gray or brownish with irregular dark blotches and usually a suffusion of orange or red on the head and neck. Many individuals retain bold colors and patterns into adulthood, but others produce increasing amounts of melanin, eventually turning solid black. Black individuals occur range-wide, but in North Carolina they are most common in the Coastal Plain. Patterned specimens may be various shades of tan, gray, brown, cream, yellowish, orange, red, silver or even greenish.

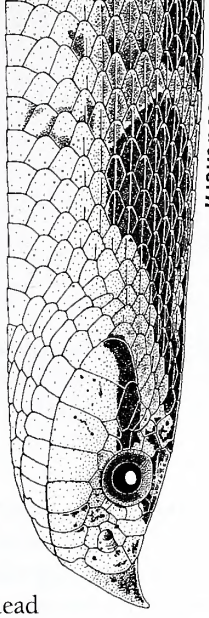
The Southern hognose snake, *Heterodon simus*, is superficially similar, but a closer look reveals a very different creature. Smaller, with a whiter belly, a more sharply upturned snout and several scale differences, it is far less common, more secretive and more habitat restricted. Its color and pattern are considerably less variable—nearly always some shade of tan or grayish brown with dark blotches. No black phase is known. Found in only six Southeastern states, it prefers xeric sand ridges and other dry, sandy habitats in the Sandhills and southeastern Coastal Plain. A creature of the longleaf pine belt, it has, not surprisingly, become rare with the obliteration of that ecosystem. Thought to be virtually extinct in Alabama and Mississippi, it is a candidate for federal listing. North Carolina currently protects it as a species of special concern—it may not legally be killed, possessed or harassed without special permit. Our state's Sandhills region may harbor some of the world's best remaining populations, and in what remains of its preferred habitat, it may actually be more common than the Eastern hognose.

BLUFFING IT

The specific epithets of both hognose snakes —*platirhinos* and *simus*—mean "flat nose or snout." (The name of a third species—the Western hognose snake, *H. nasicus*—also means "of the nose.") But besides their distinctive facial profiles, hognose snakes are renowned for their spectacular defensive



THEIR FLAMBOYANT BEHAVIORS HAVE EARNED THESE COMPLETELY HARMLESS SNAKES SUCH COLORFUL MONIKERS AS PUFF ADDER, BLOW VIPER, SPREADING ADDER, BLACK ADDER AND CAROLINA COBRA. THEY ARE VERY OFTEN MISTAKEN FOR VENOMOUS SPECIES. IRONICALLY, A HOGNOSE VIRTUALLY NEVER BITES IN SELF-DEFENSE.


Southern

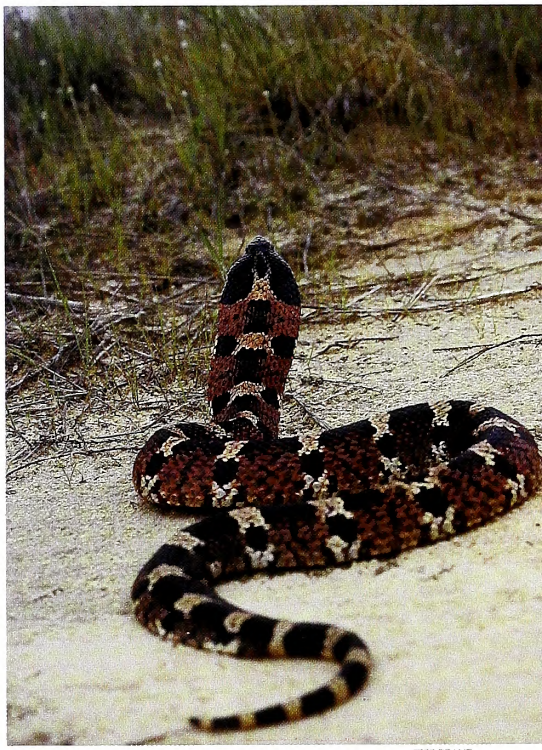
displays. Faced with a potential threat, individuals may initially freeze or attempt to flee, but if further threatened or cornered, they'll throw a virtual hissy fit, which usually includes flattening the head and neck, inflating the lung (most snakes have just one functional lung) and expelling air in long, surprisingly loud hisses. Other behaviors may include elevating the head and anterior body cobra-style, tightly coiling the tail, gaping the mouth, jerking spasmodically, kinking or stiffening the body, striking with the mouth closed, emitting an unpleasant-smelling musk from glands near the base of the tail, defecating and regurgitating partially digested toads.

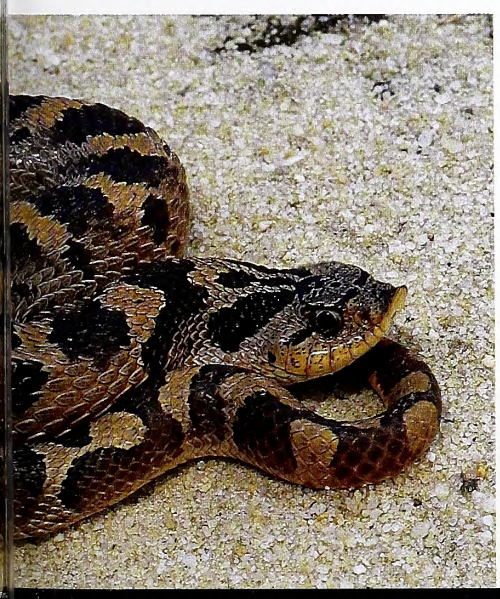
Should these tactics fail to frighten (or thoroughly disgust) an assailant, a hognose plays its final card, lapsing into a 'possum-style seizure that involves rolling onto its back, writhing as though in agony and finally lying still with its mouth open and tongue drooping. This apparently discourages many potential predators. Curiously, though, turn a death-feigning hognose right side up and it will roll over again, revealing the deception. The Southern hognose is inclined to offer a more low-key performance (occasionally none at all) than the more excitable Eastern.

Their flamboyant behaviors have earned these completely harmless snakes such colorful monikers as puff adder, blow viper, spreading adder, black adder and Carolina cobra. They are very often mistaken for venomous species. Ironically, a hognose virtually never bites in self-defense. It may "strike," but nearly always with its mouth shut. There are essentially two ways to be "bitten" by a hognose snake. One is to accidentally snag a finger on a hognose's teeth while handling a specimen that's thrashing about with its mouth open during its death-feigning performance. The other is to offer food to a hungry captive and have it mistakenly seize your hand instead.

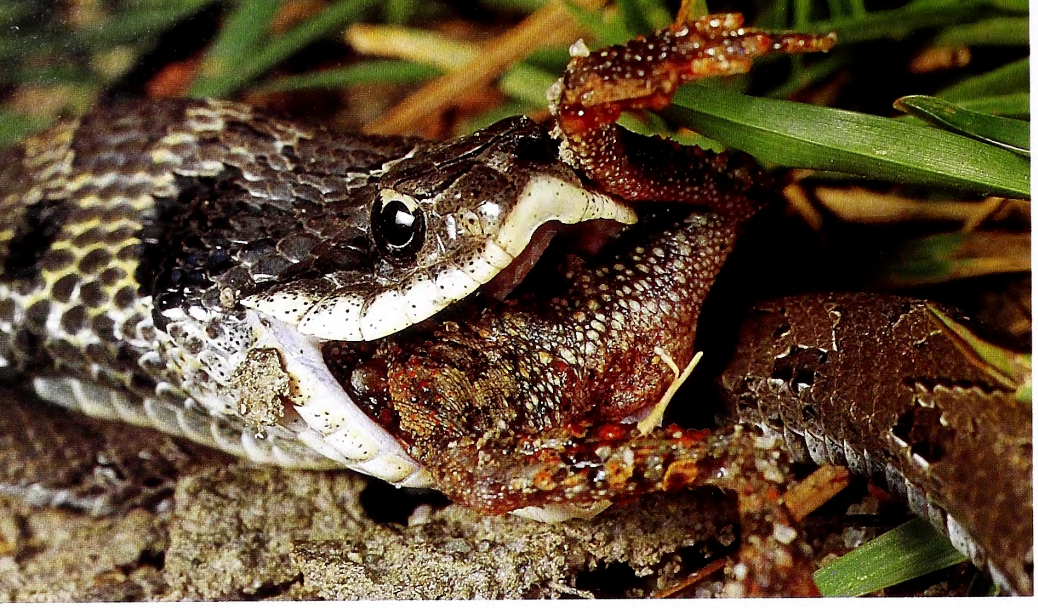
Did I say "completely harmless"? Asterisk: A few persons who have been bitten by hognose snakes (nearly always while feeding them) have reported pain, swelling and tissue discoloration. This has led some to believe that hognose snakes are mildly venomous, or at least that their saliva has some toxic properties. Others believe that the few reported reactions are primarily allergic in nature — human or any other animal saliva may produce similar symptoms in allergic individuals.

The Duvernoy's glands (modified salivary glands in the rear of the upper jaw) of hognose snakes are larger than those of most other snakes, but they lack any real venom delivery apparatus. Their enlarged rear teeth appear to function primarily in deflating toads (which defensively inflate their bodies with air when a predator attempts to swallow them). But perhaps these snakes really have set out on a long evolutionary path toward


JEFF BEANE



When an Eastern hognose gets defensive, it can resemble a cobra (above) or a 'possum. The Southern hognose (juvenile, near left; adult, far left) is considerably less variable in color and pattern than its Eastern cousin.



Hognose snakes have adapted to their habitat by eating mainly toads and hibernating in burrows or stump holes.

becoming venomous, and maybe if we could fast-forward a million years or so, we'd find them with a bit more to back up their threat displays. The properties of their saliva merit further research. Still, no one familiar with these gentle snakes would dream of considering them dangerous or hesitate to handle them—aside from perhaps exercising caution while hand-feeding them. On the one occasion a captive Southern hognose seized my thumb while I was feeding it, I allowed it to chew for several seconds, but I never had any reaction.

Toads, despite skin secretions that gag most predators, form the bulk of a hognose snake's diet. The common toads in the genus *Bufo* are preferred by the Eastern hognose, but other anurans and other prey items are also taken. Most natural food records for Southern hognose snakes from North Carolina have consisted of spadefoot toads (see "The Singing Hermit," March 2006). They are also known to eat ground skinks and six-lined racerunners. Captive hognose snakes of both species can usually be conditioned to accept mice.

One might expect an animal that eats toads to be active at night, when toads are, but that isn't the case—hognose snakes are strongly diurnal. Other than a few still-squirming roadkills that were found at night but most likely hit while it was still light, I have never seen a wild individual of either species active after dark. Although they occasionally pursue toads in the open, they more often catch them underground in burrows, using their snouts to dig after them.

Hognose snakes may mate in both spring and fall. Females grow larger than males, and males have longer, thicker tails. Eastern hognose snakes can be fairly prolific, depositing between four and 60 (usually 10 to 30) oval, white, leathery-shelled eggs in an underground chamber in early to midsummer. These hatch in late summer or fall with no parental care. The Southern hognose produces much smaller clutches; the few known from North Carolina females ranged from six to 14. Little is known of their specific nesting behavior, and no one has yet described a natural nest for a Southern hognose.

UNUSUAL ANIMALS, UNCERTAIN FUTURES

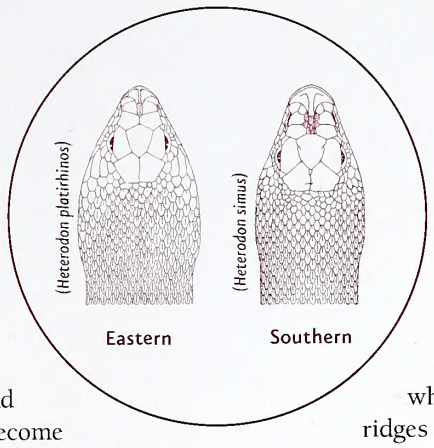
What else is unusual about hognose snakes? Well, their tongues are proportionally larger than those of most other snakes. So are their hemipenes (the paired copulatory organs common to all male snakes and lizards). I've yet to learn why. Their eyes are also rather large for animals that spend so much time underground, and their visual acuity appears to match that of most other snakes. They have fairly high metabolic rates and are relatively short-lived. The longevity record for both species is around 10 years in captivity.

The Southern hognose snake is one of the most poorly known reptiles in the Southeast, and for the past several years, I have made special efforts to learn about it. In October 1995, Tom Thorp of Three Lakes Nature Center and Aquarium near Richmond, Va., and I initiated Project Simus—a modest but long-running effort to gather basic information on the natural history, distribution and status of the Southern hognose snake in North Carolina.

The project has included radio telemetry, but even with that technology, it's difficult to learn much about an animal that spends most of its time underground and doesn't move often or far. Finding healthy specimens large enough to implant with transmitters, in areas where they can be tracked, is a difficulty in itself. Those I've tracked so far have had smaller home ranges than other snake species in the same habitat. Their movements also appear more random, showing little site fidelity, as though they were wandering aimlessly. In contrast, pine snakes and coachwhips tracked in the same habitat have definite home ranges and know their way around them. But as J.R.R. Tolkien wisely wrote, "not all those who wander are lost," and it's possible that there is some method behind the seemingly random movements.

Both hognose species are most active on the surface in early fall, when hatchlings disperse and adults may seek mates. Come winter, they hibernate below the frost line. Eastern hognoses often use stump holes or other existing underground chambers, but Southerns usually dig their own hibernacula, simply burrowing 10 to 15 inches down into the sandy soil. These burrows are often in very inconspicuous spots.

Hognose snakes have suffered tremendously from habitat loss and fragmentation. They are frequently killed by cars, and roads represent an especially serious threat to the slow-moving Southern hognose. Of the 497 specimens that I have personally encountered as of this writing, over 85 percent were roadkills. The imported red fire ant (see "Fire in the Sand," Oct. 1996) may represent another serious threat. Though difficult to document



conclusively, the decline of the Southern hognose has been especially noticeable in areas where these relentlessly predaceous and invasive ants have become abundant. Known to prey on the eggs and young of many reptiles and ground-nesting birds, as well as other small animals, fire ants are a huge problem in Southeastern ecosystems, one for which no solution seems evident.

All hognose snakes are specialists, scarfing toads as they burrow and bluff their way through life, but Southern hognoses, with their affinity for sand ridges and spadefoots, are ultra-specialists with a much poorer survival prognosis than their more adaptable cousins. Specialists thrive when the world stays the same; when it changes rapidly, they perish. The Southern hognose may in fact require little more than unfragmented tracts of sandy soil with an ample food source, but we have proved unwilling to spare it even that. With coastal development at maximum capacity and many wetlands drained, developers scramble to claim what remains—uplands. Sand ridges everywhere are now prime real estate and rank among the most imperiled habitats on Earth.

Much remains to be learned about the ecology, physiology and behavior of both our hognose snakes. But having a life history that is difficult to understand or document makes any animal or plant that much more interesting. Naturalists have always been both the happiest and the saddest people I have ever known—happiest because a vast source of wonder and delight surrounds them; saddest because they form a minority, with the current majority hell-bent on destroying their source of happiness.

Hognose snakes typify this situation for me. It's as difficult for me to comprehend anyone's fear or loathing of them as it is for me to think of all the ways they enrich the world, not to mention my own existence. Whether recalling the incredible day I found 17 Southern hognose snakes or remembering my very first encounter with an Eastern hognose along a Wake County beaver swamp long ago, I can only regard them as an integral part of my life. I wouldn't want to live in a world without them—and that's no pretense. ◆

Jeff Beane is a herpetologist with the N.C. Museum of Natural Sciences.

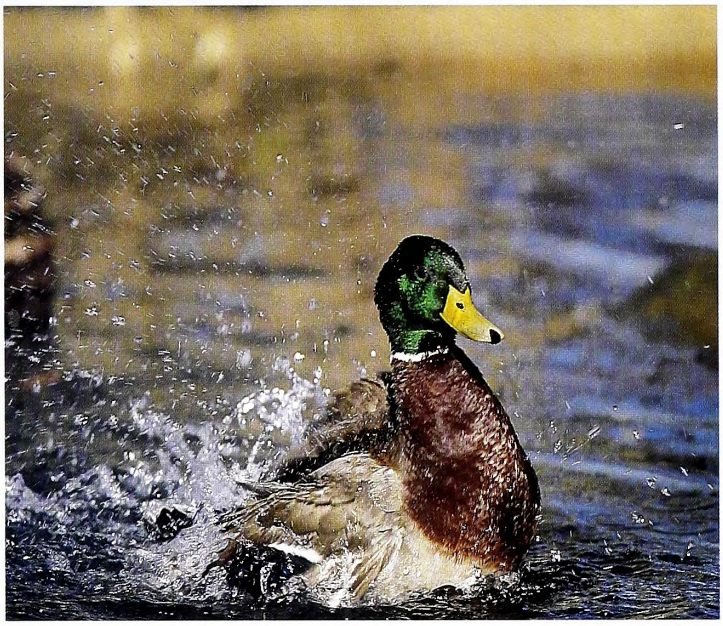
How Can "Playing Dead" Stop A Predator?
See Nature's Ways, page 39.

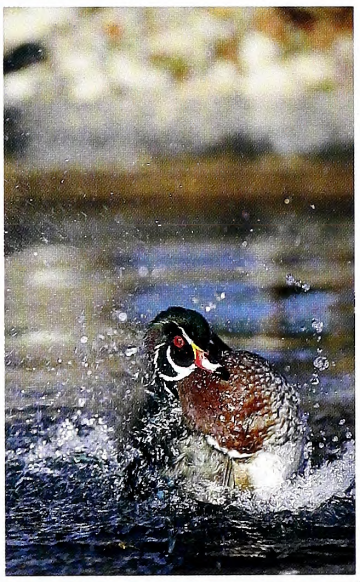
Waterfowl *on the move*

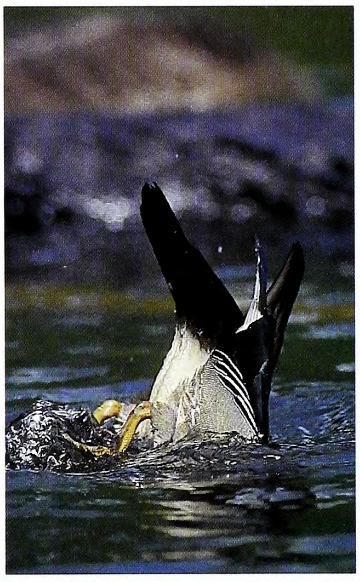
For centuries they have come each autumn. Through mysterious invisible pathways in the sky, they migrate from the Dakotas, from Canada and some from beyond the Arctic Circle.

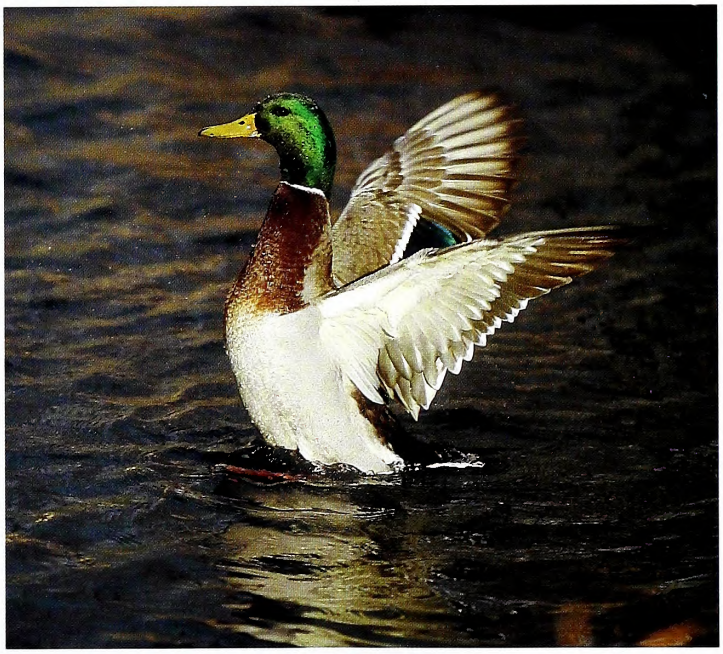
WRITTEN AND PHOTOGRAPHED BY F. EUGENE HESTER

North Carolina has a long and colorful history intertwined with migratory waterfowl. In past centuries, American Indians and early European settlers depended on waterfowl for food and down feathers, and later for economic income. Early records tell of the days of market hunting, sink boxes, live decoys, the artistry of handmade decoys and the skills developed in calling and hunting these birds. Times have changed, but people continue to recognize and enjoy the many benefits that ducks, geese and swans provide. Each autumn, North Carolina is blessed by these birds that come to spend the winter months with us.









Mallard

The mallard is one of the most recognizable and sought-after of all our ducks. At about twice the size of a wood duck, and three times as large as a teal, it is considered one of the big ducks. Mallards decoy well, and the drakes, known to hunters as greenheads, are highly prized. Seeing them circle and come in from downwind to land among the decoys is the highlight of many duck hunts.

Mallards feed on seeds in marshes and flooded grain fields, and they especially like temporarily flooded bottomland hardwoods, where they feed on acorns.

Wood Duck

Wood ducks are our own home-grown ducks. They nest here in natural tree cavities and in nesting boxes specifically made for them. Some of our wood ducks migrate to states farther south, but many of them stay here all year. They are joined by others migrating from more northern states that come to spend the winter here. Wood ducks are basically ducks of swamps and rivers, and acorns are one of their favorite foods.

Wood ducks are experts at dodging limbs while flying between thick swamp trees at incredible speeds. Their call is not a quack like that of many other ducks, but rather more of a squeal, from which the duck gets "squealer" as one of its nicknames. In most years there are more wood ducks killed in North Carolina than any other species.

Opposite page: American wigeons (top), blue-winged teal (left, bottom) and tundra swans each winter in North Carolina. Mallards (right, top and bottom) and wood ducks are two of our most common game species of ducks.

Northern Pintail

Pintails are early migrants, often arriving here in October. Some pintails migrate as far as South America for the winter. They seem to have a remarkable ability to know where rain has recently fallen and appear there overnight to feed in temporarily flooded fields. They may fly long distances from resting areas to feeding areas and sometimes make these flights at night.

Drake pintails, with their bold, colorful markings, long necks and long, pointed tails, are often thought of as the aristocrats of ducks. Because of their long tails, they are sometimes called "sprigs."

Blue-Winged Teal

Blue-winged teal are our earliest migrants, usually arriving in September. Although some stay for the winter, many of them continue farther south, and many blue-winged teal winter in Mexico, Central America and South America.

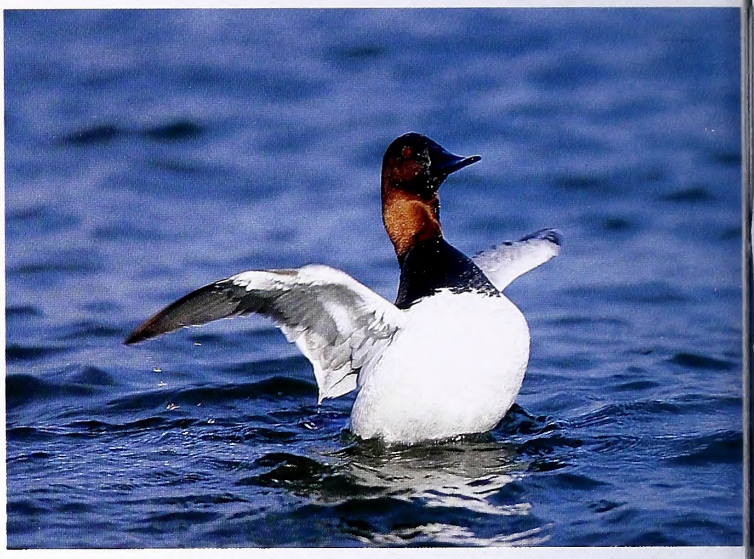
These small ducks undergo a late and gradual change to their breeding plumage, and drakes and hens look similar in the fall. They both have bright blue shoulder patches. Not until winter do the drakes get the characteristic white crescent on their faces.

Green-Winged Teal

Green-winged teal are small, fast-flying ducks. Because of their small size, they often appear to be farther away than they really are and move at deceptive speeds. They are well known for flying in flocks that quickly appear, and buzz over decoys and are gone by the time hunters notice them.

American Wigeon

The American wigeon is a medium-sized duck with a short, pale blue bill. Wigeons are easily recognized by the large white patches on their wings, and the white foreheads of the drakes. Because of their white foreheads, they are also known as "baldpates."

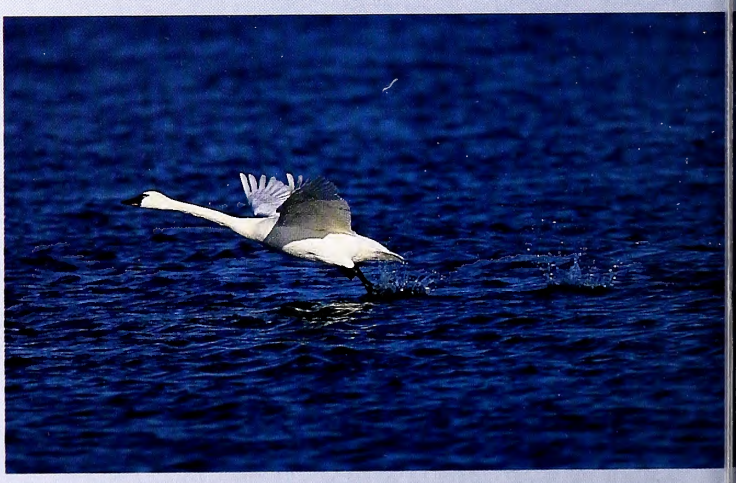


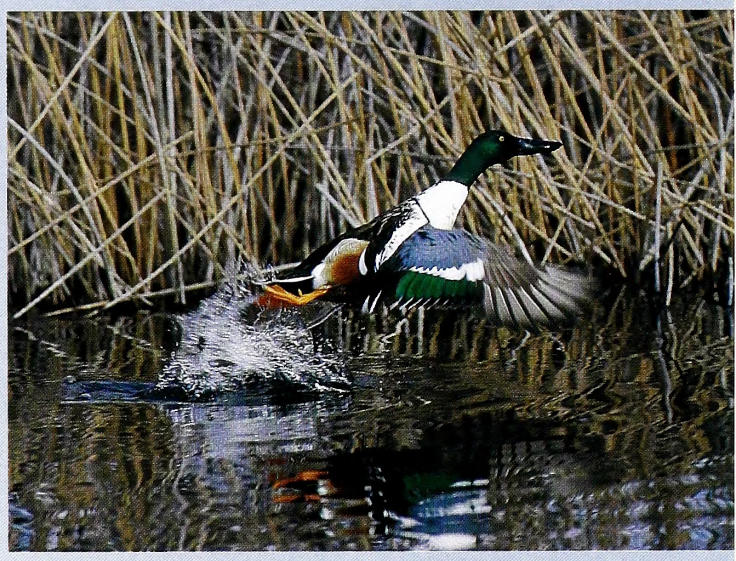
Wigeons are often found with flocks of pintails and green-winged teal. In addition to feeding in shallow flooded agricultural fields and marshes, they often can be found grazing on grass or other green vegetation on land, sometimes even on lawns.

Northern Shoveler

The drake shoveler is one of our more colorful ducks with its white breast, chestnut sides and iridescent green head. This duck is easily recognized by its spoon-shaped bill, which gives rise to the nicknames "spoonbill" and "smiling mallard." The bills have comblike projections that are used to strain seeds and small invertebrates from water.

Northern pintails (left) and a tundra swan show two different ways of taking to the air. A green-winged teal (lower right) stretches its wings.





Canvasbacks, American wigeons and Northern shovelers are regular visitors during the winter.

Canvasback

The canvasback is often regarded as the king of the diving ducks. It is boldly colored with a chestnut head and neck, black breast and tail, and white body. It has a wedge-shaped bill and forehead.

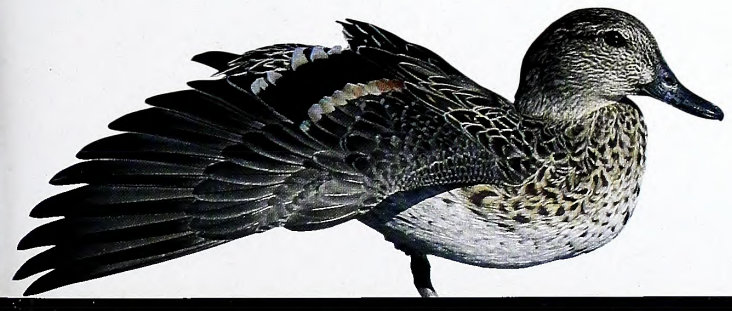
Canvasbacks that feed on wild celery and similar aquatic vegetation have a flavor considered one of the finest. During market days, they were heavily hunted and sold. Canvasbacks are large ducks, fast fliers and excellent divers. They often find their food several feet below the water's surface.

Tundra Swan

Tundra swans are long-distance travelers. They nest in northern Canada and Alaska, and migrate south, especially to eastern North Carolina, for the winter. Mattamuskeet and Pocosin Lakes National Wildlife Refuges are nationally recognized as special wintering areas for these swans.

With their long necks, they can feed on underwater plants several feet deep by simply tipping their bodies and extending their necks. They also fly to fields to feed on scattered corn and soybeans as well as tender green winter wheat. With their all-white plumage, tundra swans appear in sharp contrast to the blue sky or blue water. ◆

Frequent contributor F. Eugene Hester is retired from the U.S. Fish and Wildlife Service.



A male gadwall (right rear) pecks at another male during a courtship flight.

COURTSHIP FLIGHTS

By midwinter, pairing of ducks is well under way. Spectacular courtship flights may be seen, in which one hen is closely accompanied by several competing drakes. They fly in a tight but changing formation. In some species, a dozen or more drakes may accompany and compete for a single hen.

TO RAISE A HUNTER

For parents faced with stiff competition from urban activities, INSTILLING THE LOVE OF HUNTING IN A CHILD IS NO EASY TASK. But MY, OH MY, is it WORTHWHILE.

WRITTEN BY T. EDWARD NICKENS & PHOTOGRAPHED BY MELISSA McGAW

Five minutes into the hunt and Jack is antsy already. He hardly slept last night but still bolted from the bed at 5 a.m. "I'm ready to go huntin'!" he exclaimed, dropping the letter "g" that I hope he'll pick back up soon.

He is 5 years old, a carbon copy of his dad — like you spit him out of your mouth, as the old folks say around here — and it's his first trip to the woods during which the primary intent and purpose, or so he thinks, is to shoot an animal, clean it, bring it home and put it on the dinner table.

Now we're hunkered down at the base of a soaring swamp chestnut, and as the morning's first birds begin to stir, he's starting to squirm. At first, it's not particularly disruptive. He sticks his tongue out as far as possible and tries to look at the tip. I nudge him with an elbow. "Easy. Stay still." He gives me a double thumbs up. Twenty seconds later he runs his finger around the Red Ryder logo on his BB gun. A full minute passes, and now comes a lion-sized yawn. He rubs his eyes and leans against me, making little clucking sounds that tell me the hunt is very close to being over.

"HEY, DAD," HE WHISPERS.

"YES, SIR?"

"WHEN ARE WE GOING TO START SQUIRREL HUNTIN'?"

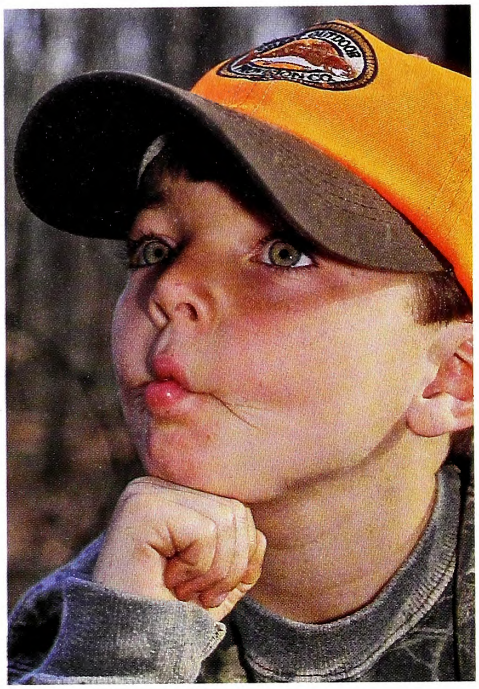
"WE ARE, JACK," I GRIN. "RIGHT NOW. BE STILL."

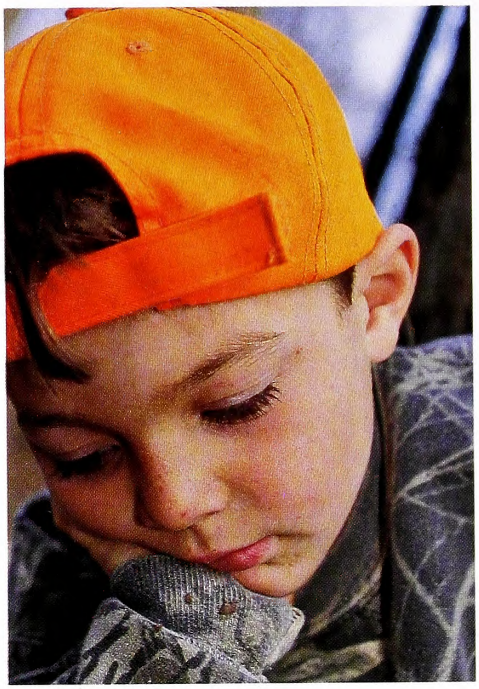
He glances out over the oak flat. Despite my honest descriptions of what to expect, I can only imagine what he anticipated. Hordes of squirrels trooping through the treetops, no doubt. Branches heavily laden with furry targets. With luck, perhaps a few crazed rodents might even attack with enough vigor to require fending off with the Red Ryder gun and the Star Wars lightsaber alike. Many things, but not this.

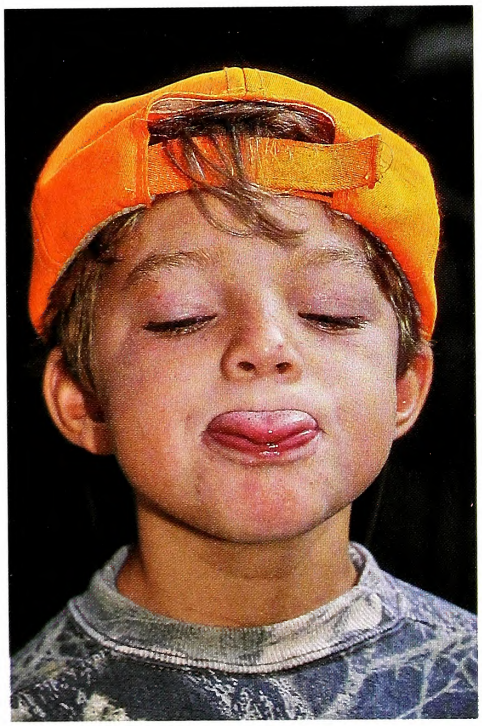
"But this isn't squirrel *huntin'*, Dad," he whines. "This is . . . this is just ol' boring squirrel *lookin'!*"

I laugh to myself and tell him to keep his eyes peeled, but I can tell he's ready to stretch his legs, scratch his back, do something other than sit stone still. And that's perfectly fine. He is 5 years old, and the point, although he does not know it, is not to kill a squirrel today. The point is to make him want it — want the woods and the gun and the dawn colors, want the thrill that comes when an animal approaches close and closer still. The point is to make him want all of that at least as badly, and deeply, as he will soon want to play baseball and chase girls and drive family vehicles at speeds and in a manner for which they are not designed.

But more than anything else, the point is to help him understand that pulling the







THE TRICK IS THE TRANSITION — OR EVOLUTION — TO THE POINT IN A YOUNG HUNTER'S LIFE WHERE WHAT MATTERS AT LEAST AS MUCH IS THE CHANCE TO TAKE THE HUNTER'S PLACE IN THE NATURAL WORLD.

trigger is a small part of the hunt. A lust for blood and burned powder are phases to nurture and celebrate but ultimately to pass through. The trick is the transition — or evolution — to the point in a young hunter's life where what matters at least as much is the chance to take the hunter's place in the natural world.

So we get up and stretch, and just as we do, two squirrels do what squirrels do best — materialize from nowhere. They make a break for a knothole not 40 feet away as Jack scrambles for the Red Ryder.

"Oh, man!" he grimaces. "Why'dja have to scare 'em off like that, Dad?"

I laugh. He'll get there. I hope.

From what I can tell, getting kids to want to shoot guns is the easy part. In an age of instant gratification, few things respond so instantly as primer, powder and firing pin. But bringing together a love of hunting and a reverence for the lives of wild animals, both the utter wonder of the intricate worlds beyond the sidewalk and the utter reality of predator and prey — now we've got a hard row to hoe.

And it's getting harder and harder to break that ground. There is little point in miring down in the standard excuses of the post-modern hunter — that there are fewer and fewer places to hunt. That there's too much competition from soccer and skateboarding. That hunting is increasingly out of sync with mainstream society, and it's just not worth the trouble explaining to other parents, teachers, whomever. That is all true, and the world that we live in, and the challenge that we face.

My two children — Jack's sister, Markie, is 8 years old — spend the vast majority of their time in the city, in activities far removed from the natural world. Swim team and school, homework and basketball. It's not easy making sure that there's an equal measure of campfires and campouts, nature hikes and wading waist deep in swamp muck. Exposing them to hunting is more difficult still.

For their first few years, it was simply a matter of exposure. They'd look for me to return home from morning hunts with unbridled enthusiasm. "What'd you get, Daddy? Ducks? A turkey? Can I see? Can I see?" I'd toss them each a mallard or two, or let them help me drag the deer to the backyard. I'd point out the difference between primary and secondary wing feathers. Explain how antlers grow. I've always figured that for young kids particularly, hunting needs to be viewed as an integral and customary part of life, not something Dad or Mom does "out there," in a world apart from their Legos-and-American Girl frame of reference.

But soon enough they were no longer content with a passive role in Dad's seemingly all-encompassing pastime.

"Daddy, when can I go hunting?"

So I've begun to take them — too soon, some might say, and I struggle with that. But I want them to begin to grasp — to come to know, slowly, on their own — an understanding of hunting as an expression of faith. Faith in a system of scientific wildlife management that does its best to discern the natural surpluses of our woods and waters. Faith in a natural order free from the emotional bondage of Bambi and Pixar Studios. Faith in traditions that have bound humans and wildlife together for ages. What that faith looks like in the field is personal dogma — eat what you kill, hunt only prey species, still-hunt or dog hunt, bait or no bait — and yours is yours and mine is mine, and as long as we've each given it thought and consideration, that should be good enough for each of us.

To emerge from childhood to adulthood with a hunter's heart, Markie will have to navigate a culture in which there are few female hunters to serve as role models, although that is changing somewhat. I suspect she'll have to deal with peer pressure that will hardly embrace the notion of a girl and a gun. She already shows a definite affinity for serious

wildlife science: her collections of raccoon bones, sharks' teeth and skulls are as dear to her heart as horse books and hair accessories. But it's early in the game. Middle school looms, and raising a girl hunter will pale in importance to raising a teen-aged daughter I still recognize. It will be a hard row to hoe.

Brother Jack will face slightly shorter odds, thanks to his gender. But still the siren calls of ball sports and video games, and the growing unhipness of hanging out with Dad, will be there, taunting from the sidelines. Finding pals to play ball with will always be easy. He'll have a tougher time finding peers to share an interest in hunting.

It may be too much to hope for. But hunters have hope in spades.

We've folded up the camouflage netting now. We could try to still-hunt for squirrels, but I suspect Jack's patience for taking five steps every 60 seconds would only rival his appreciation for sitting stumplike in the dawn woods. My worst move would be to force him to do what I want to do. I remind myself: This truly is all about him.

"So," I ask, "what do you want to do?"

"I don't know. Maybe there are some frogs or something around here."

I feel the agitation stir. I've burned up a weekend morning carefully crafting his first hunting experience, and he wants to go catch frogs. Easy, Dad, I think. This is where the wheels come off.

"Little man," I say, "it's a little late in the year for frogs, but I think I know a spot where we might get lucky."

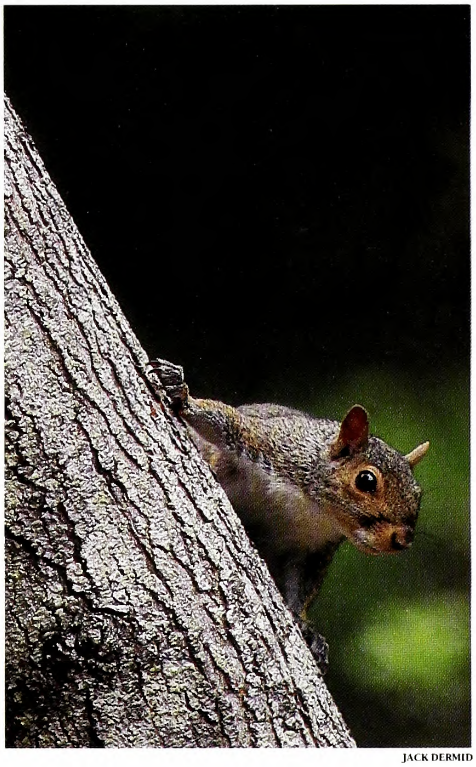
"Sweet!" he says. "Can I shoot one?"

I say, "No," of course, and firmly. And then, not as firmly: "And why would you want to shoot a frog?"

But in my hunter's heart I know. And I know that I have some work to do. The best kind of work there is. ◆

T. Edward Nickens is an editor-at-large at Field & Stream *and a regular contributor to* WINC.

Teaching a child the difference between squirrel huntin' and squirrel lookin' requires lots of explanation and patience.



JACK DERMID

MY WORST MOVE WOULD BE TO FORCE HIM TO DO WHAT I WANT TO DO. I REMIND MYSELF: THIS TRULY IS ALL ABOUT HIM.

"SO," I ASK, "WHAT DO YOU WANT TO DO?"

"I DON'T KNOW. MAYBE THERE ARE SOME FROGS OR SOMETHING AROUND HERE."

Why ENDANGERED SPECIES Matter

THE WORK AND WORDS OF THREE ESSENTIAL CONSERVATIONISTS HELP DEFINE THE BENEFITS OF KEEPING 'EVERY COG AND WHEEL.'

Ivory-billed woodpeckers. Sea turtles. Tigers. Whooping cranes. Sea otters. And most of all, the universal icon—pandas. These and a handful of other species appearing on Earth's much-too-long list of threatened and endangered wildlife rally the support of nearly everyone from school children to truck drivers. These imperiled animals typify those charismatic species that command such positive endorsements as "cuddly," "majestic" or "awesome" and, in turn, readily inspire our sympathies and attention. As such, charismatic species scarcely require further justification to initiate efforts designed to save them from extinction—they are an "easy sell" for protection and management.

But what of the other endangered species, the many hundreds that are anything but charismatic? Humans often regard many of these as creepy, slimy, ugly or even dangerous, and many more are simply dismissed with an uncaring shrug—a beetle, snail or toad, for example. Why should we care about these species, let alone commit resources to assure they continue to exist in healthy populations? And why, as headlines often proclaim, should an endangered spider, salamander or mouse stymie a highway, airport, power plant or other project that might advance human progress?

To address such questions, let's review the lives and philosophies of three giants in the annals of conservation whose ideas, while each considerably different in its thrust, nonetheless can be tied to the conservation of endangered species and help answer the question: Why should we care?

written by **ERIC G. BOLEN**

Muir's Transcendental Approach

The first is John Muir (1838–1914), a Scot by birth who immigrated as a boy with his family in 1849 to farm in Wisconsin. Muir later studied geology and chemistry in college and afterward, anxious to see the wonders of North America, *walked* 1,000 miles from his home to the Gulf of Mexico and from there shipped out to California. The magic of the Sierras and especially Yosemite Valley immediately captivated Muir, but he was also dismayed at the large tracts of forest ruined by thoughtless exploitation. The indiscriminant logging of redwoods was especially troublesome for the young Scot, and he started writing newspaper articles to draw attention to the dismal situation. He later wrote several books about his beloved mountains and valleys and the threats to their forest ecosystems.

His concerns for wilderness preservation became the cornerstone for the Sierra Club, which he founded in 1892. Muir's relentless crusade included an invitation to Teddy Roosevelt to experience the Sierra's grandeur firsthand, and the young president—never a shrinking violet—journeyed to California where the two men camped alone for three days in the unspoiled wilderness. Unfortunately, neither recorded their conversations (despite the fact that both were prolific writers), yet we can infer the unmistakable impression that Muir and his mountains made on the president. Roosevelt clearly shared Muir's deep-seated beliefs when he addressed a crowd in Sacramento soon after leaving the Sierras:

"Lying out at night under those giant sequoias was lying in a temple built by no hand of man, a temple grander than any human architect could by any possibility build, and I hope for the preservation of the groves of giant trees simply because it would be a shame to our civilization to let them disappear. They are monuments in themselves."

Muir had long championed a national commitment to the preservation of natural areas, but progress was slow and the mission lacked the structural unity to succeed. Thus, in 1911, Muir submitted a plan to create a federal agency responsible for parks to then-President William Howard Taft. Taft, however, lacked his predecessor's aggressiveness and accordingly took no action. Fortunately, Muir's vision became a reality when the National Park Service was established in 1916, two years after his death.

So what insight did John Muir give us that can be applied to endangered species? His concepts are rooted in the philosophies of Ralph Waldo Emerson and Henry David Thoreau, each a well-known writer and thinker of the mid-1800s. The result is known as the Romantic-Transcendental Preservation Ethic—the hefty designation for their collective beliefs—that regards communion with nature as a means of bringing humans closer to their divine creator. Nature, in short, is a temple that can only be sullied by the economic activities of humans, of which logging was a prime example for Muir.

Harmony and the beauty of nature are the cornerstones of transcendentalism, and Muir translated this concept into preservation—simply put, leave nature alone. To Muir, then, we can assign the idea that species must be preserved simply because they represent the marvelous works of God, and their continued

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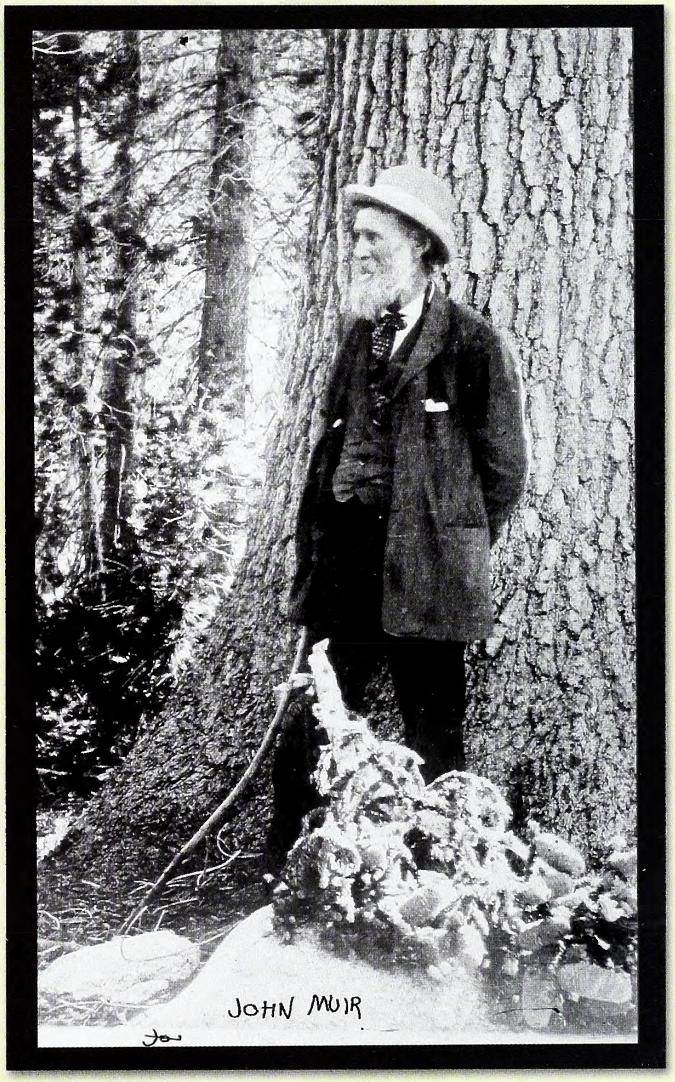


God has cared for these trees,
saved them from drought, disease, avalanches,
and a thousand tempests and floods.
But he cannot save them from fools.

– JOHN MUIR

presence in nature must not be jeopardized by the activities of thoughtless (and often greedy) humans. He wrote:

"Why should man value himself as more than a small part of the one great unit of creation? And what creature of all that the Lord has taken the pains to make is not essential to the completeness of that unit—the cosmos? The universe would be incomplete without man; but it would also be incomplete without the smallest transmicroscopic creature that dwells beyond our conceitful eyes and knowledge."

Pinchot: Pragmatic Conservation

The concepts of Gifford Pinchot (1865–1946) provide a second outlook—one that presents a highly pragmatic view for the value of natural resources. Pinchot, the scion of a wealthy family, was the first American to be trained in forestry, a discipline that in the 1880s was otherwise practiced primarily in Europe. He pioneered the concept of using science to manage the nation's forest resources, which he thought were best protected by weight of the federal government instead of private enterprise. Most importantly, he recognized that natural resources could be renewed—virtual heresy in an era when forests typically were cut to the ground and then abandoned as wastelands.

In 1892, Pinchot's progressive approaches landed him the job as the resident forester at the Biltmore Estate, where he spent three years managing lands that, in part, later became the nucleus of the Pisgah National Forest. Pinchot then moved to Washington, D.C., to join the National Forest Commission, and, in 1898, to head the Division of Forestry. He also helped found the Yale School of Forestry in 1900, the first of its kind in the United States.

But it was in the administration of Teddy Roosevelt that Pinchot rose to national prominence. With Roosevelt in command, Pinchot's ideas gained full currency and, when the president established the U.S. Forest Service, he named Pinchot as its first chief. The two men worked closely together to withdraw large areas from the public domain to create national forests. Pinchot also coined the term "conservation" during this period, but his influence waned when Roosevelt left office, and he was forced to resign after a feud involving Richard Ballinger, Secretary of the Interior in President Taft's cabinet. He later served two terms as governor of Pennsylvania.

FRANCES BENJAMIN JOHNSTON

Conservation is the application of common sense to the common problems for the common good.

– GIFFORD PINCHOT

Pinchot championed the protection of forests and other natural resources, but he based his beliefs on their economic values. His views established the Resource Conservation Ethic, which in both theory and practice differed greatly from Muir's spiritual concepts of nature. He believed that forestry represented "the art of producing from the forest whatever it can yield for the service of man," which considerably narrows the importance of many species and may completely overlook many others. For example, the bark of Pacific yew provided the initial source of a drug that is now a mainstay in the treatment of ovarian cancer. However, the timber value of Pacific yew is so limited that foresters for decades considered it a weed to be removed in favor of species better suited for sawmills and paper production. Hence, the economic potential of a species cannot be based solely on the current knowledge of its usefulness—had Pacific yew been eradicated, as was once intended, a vital cancer treatment might have been lost.

A more unfortunate example concerns Australia's gastric breeding frog, a species that broods its young internally. These unique frogs were discovered in 1973 only to become extinct just six years later, well before scientists could learn how the offspring were protected from their parents' acidic gastric juices and thereby potentially advance the treatment of stomach ulcers. Pinchot might not have fully appreciated the idea that the

only truly useless species is one that has become extinct.

Whereas the views of Muir and Pinchot lay the opposite ends of the spectrum regarding nature and the importance of species, they nonetheless shared common ground: Each viewed nature from the standpoint of human welfare. Muir stressed spiritual enlightenment, whereas Pinchot emphasized the economic importance of species. But neither Muir or Pinchot recognized that nature — a complex of species and their interactions in a physical environment — held an intrinsic value that remained independent of its relationship with humans. This concept brings us to the final philosophy regarding the importance of species, and especially those whose future is uncertain.

Leopold and Intrinsic Worth

Aldo Leopold (1887–1948) is regarded as the father of wildlife management in the United States. A native of Iowa, Leopold attended the Yale School of Forestry and, after graduating in 1909, joined the fledgling U.S. Forest Service to work in the Arizona and New Mexico territories. Whereas his job was typical of a young forester — timber surveys, mapping and fire protection — his insight eventually led him to appreciate the importance of untrammeled landscapes, and he is directly responsible for establishing the first national wilderness area within a national forest. This was no mean accomplishment at the time, given the continuing predominance of Pinchot's views that national forests should exist for timber production and not for such things as the grandeur of nature. The National Wilderness Preservation Act, in fact, was not realized until 1964.

In 1935, he co-founded the Wilderness Society and, in 1937, The Wildlife Society that today presents the Leopold Award in his honor to recognize the contributions of an outstanding wildlife biologist. By 1933 Leopold had left the U.S. Forest Service and joined the faculty at the University of Wisconsin; he also published "Game Management" in the same year, the first textbook of its kind. His position at Wisconsin established the first academic unit devoted exclusively to the scientific training of students as professional wildlife managers — a proactive move that soon overshadowed the more passive approach of simply enacting more laws that continually restricted the harvest of deer, doves and ducks. In short, wildlife management in the United States came of age under Leopold, just as forestry had matured under Pinchot.

Beyond achieving these important advances, Leopold forever gained lasting fame in the halls of conservation when his landmark "Sand County Almanac" was published in 1949. Regrettably, Leopold did not live to see his classic in print; he died in 1948 while fighting a grass fire near his beloved shack, a rustic retreat where he wrote his essays and reclaimed the surrounding land that had suffered from years of drought and neglect.

Leopold's close touch with the land during his years in the forests of the American Southwest and, especially, in the impoverished farmland in Wisconsin culminated in the Evolutionary-Ecological Land Ethic. This view holds that nature consists of interlocking parts — species — that have evolved into a functioning, interdependent system, much as mountaineers rope themselves together when scaling a cliff. He believed that each species has its own intrinsic value, irrespective of any values tangible or otherwise it may have for humans — species have evolved and fit intricately into a complex jigsaw puzzle whose pattern may lie beyond our comprehension. Thus species lack positive, neutral or negative values, but instead attain their worth as parts of an ecosystem. Indeed, Leopold considered humans as just one part of the biotic community and not as its masters, even though we

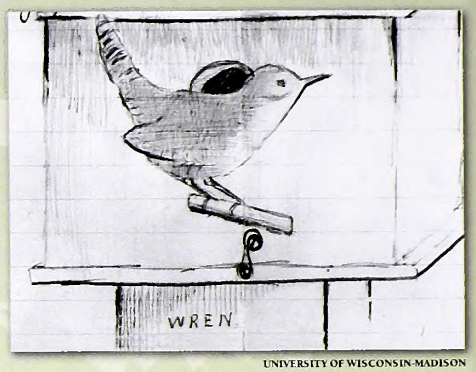
V.G. SCHRECK

LIBRARY OF CONGRESS

The ideas and work of Gifford Pinchot made a lasting impression on the forests around Biltmore (left) and throughout the mountains.

have dynamite, bulldozers, concrete, pesticides and other potent tools at hand to modify nature and its workings. Humans therefore might use and manage nature—hunting, for example—but only in a responsible way, not the least of which recognizes the intrinsic values of other species and of whole and healthy ecosystems. Leopold recognized the importance of each species, from soil microorganisms to timber wolves, in the web of life we call nature. He captured the importance of species, realized three decades later in the Endangered Species Act, when he wrote "To keep every cog and wheel is the first precaution of intelligent tinkering."

Today, Leopold's concepts are underscored with the knowledge that some species represent keystones in the continued welfare of natural communities. Sea otters represent a clear example of this relationship. When fur hunting eliminated sea otters from many areas along the Pacific coast of North America, sea urchins—one of otters' primary foods—rapidly increased and overgrazed stands of brown kelp—their primary food—to the point that entire kelp forests were destroyed. This in turn removed the habitat for nearly 100 species of invertebrates and 38 species of fishes, some of which occur exclusively in kelp forests. In short, the kelp-forest community collapsed with the removal of sea otters. A somewhat similar situation occurs in Florida where habitat loss threatens gopher tortoises. The burrows of the tortoises provide refuge for a score of other vertebrates as well as invertebrates, thus a community of animal associates are in turn adversely affected when the tortoises and their burrows disappear.



UNIVERSITY OF WISCONSIN-MADISON

A young Leopold's drawing of a house wren.

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.

– ALDO LEOPOLD

UNIVERSITY OF WISCONSIN-MADISON

Someone once noted that losing a species is like burning a book before it's read, to which one might add that losing an ecosystem—longleaf pine, for example—is like burning an entire library. Whether one adheres to the spiritual reverence of Muir, the hard-dollar values of Pinchot or the inherent ecological workings of Leopold (or some combination of the three), it seems unconscionable to remain silent whenever another species heads toward the brink of extinction. In the words of the late John Sawhill, "In the end, our society will be defined not only by what we create, but by what we refuse to destroy." ⬘

Eric G. Bolen is an emeritus professor of biology at UNC Wilmington.

MELISSA McGAW

BROWN PELICAN
Pelecanus occidentalis

MELISSA McGAW

RED WOLF
Canis rufus

STEVE HALL

SAINT FRANCIS' SATYR
Neonympha mitchellii francisci

ENDANGERED SPECIES ACT VALIDATES LEOPOLD'S ETHIC

The Endangered Species Act (ESA) reached fruition in 1973, but only after a long history of neglect of wildlife. Gone were the passenger pigeon, once likely the most abundant bird in North America, the Carolina parakeet, the Labrador duck and the heath hen. A similar fate almost claimed bison, whooping cranes, black-footed ferrets, Florida panthers, gray whales and California condors.

To be sure, some major federal actions eventually intervened to halt the unchecked exploitation of some species. In 1903, President Theodore Roosevelt established the first unit in what was to become a national system of wildlife refuges when he protected a rookery of egrets and herons in Florida from the ravages of plume hunters. The Migratory Bird Treaty Act (1918) notably ended market hunting of waterfowl, as well as spring hunting, but the law did not cover many other kinds of birds nor did it consider other vertebrates (mammals, reptiles, amphibians or fishes) or the immense number of invertebrates and plants. In 1940, the Bald Eagle Protection Act formally guarded the nation's national symbol, although until 1959 bounties still were paid on bald eagles killed in Alaska.

The ESA followed two other attempts (in 1966 and 1969) to address the protection and management of endangered species, each of which had important limitations that were corrected in 1973 (when, for example, plants were included). The new version clearly recognized endangered species as components of ecosystems — thereby recognizing Leopold's ethic — and stressed that their continued existence provided the nation with a broad range of values: cultural, aesthetic, ecological, educational and historical, as well as scientific. The term "rare" was discarded in the language of the 1973 act, which instead acknowledged only endangered species — those facing extinction in all or much of their distribution — and threatened species — those likely to become endangered.

An important component of the 1973 law recognized separate populations and subspecies as "species," which thereby included organisms that otherwise might be excluded from protection. For example, the Florida panther is a highly endangered subspecies of the far more abundant mountain lion; fewer than 100 persist in southern Florida. If subspecies had not been recognized by the 1973 act, the Florida population of mountain lions would not have qualified for federal protection.

Similarly, while some biologists argue that the red wolf is not a well-defined species or subspecies, it makes no difference: Under terms of the law, the ESA protects red wolves as an endangered population, and they are managed as such in eastern North Carolina. The ESA also requires that a recovery team of biologists, managers and other specialists be assigned to each listed species, which is thereafter studied and managed in keeping with the recommendations of the team. A recovery team was recently assigned to the ivory-billed woodpecker after the bird was rediscovered deep inside a river-bottom forest in Arkansas.

North Carolina is not without its share of listed species. These include 13 mammals, eight birds, seven reptiles and amphibians, four fishes, two insects, nine freshwater mussels and 27 plants. Under the ESA, each of these species falls under the primary jurisdiction of the U.S. Fish and Wildlife Service, but the law also encourages the joint participation of appropriate state agencies and private organizations.

Protection and management activities, of course, vary by the species in question, and these may range from simply leaving the animals alone, as for example no longer harpooning gray whales, to intervening with captive breeding programs for such species as black-footed ferrets and whooping cranes. In most cases, however, the protection and management of critical habitat remains the key component in the recovery of a threatened or engendered species, as shown by the systematic burning of longleaf pine communities for the benefit of red-cockaded woodpeckers and a host of other organisms, including the pines themselves.

—Eric G. Bolen

While the brown pelican is an endangered species success story, the red wolf is well on its way to recovery and the Saint Francis' satyr is found in only one location in North Carolina.

MOURNING DOVES

Coo-ahh, cooo, cooo, coo. No, that haunting song is not an owl. It comes from a mourning dove, the most familiar of North Carolina's doves and pigeons. All these birds are

Cooing Cousins

written by Julie Dunlap
illustrated by Consie Powell
nature activity by Anne M. Runyon

Only some mourning doves migrate. In winter, North Carolina's mourning doves include birds that have flown here from farther north, plus permanent residents.

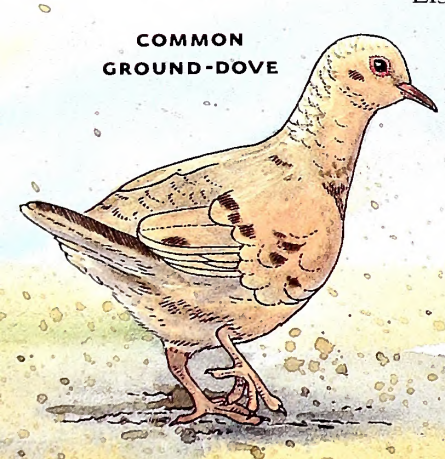
Cooing voices are not the only thing that pigeons and doves have in common. All belong to the family Columbidae, a group of over 300 species of swift, graceful fliers with small heads and short legs. Their slender bills are uniquely adapted to a diet of nuts, seeds and fruits and to a need for lots of water. Other birds must scoop up water in their beaks and tilt their heads back to swallow, but pigeons and doves can use their slender bills like straws to suck up water without lifting their heads. Such adaptations have made it possible for pigeons and doves to live almost anywhere—in tropical forests, deserts, farm fields and city streets—on every continent except Antarctica.

NAME GAME

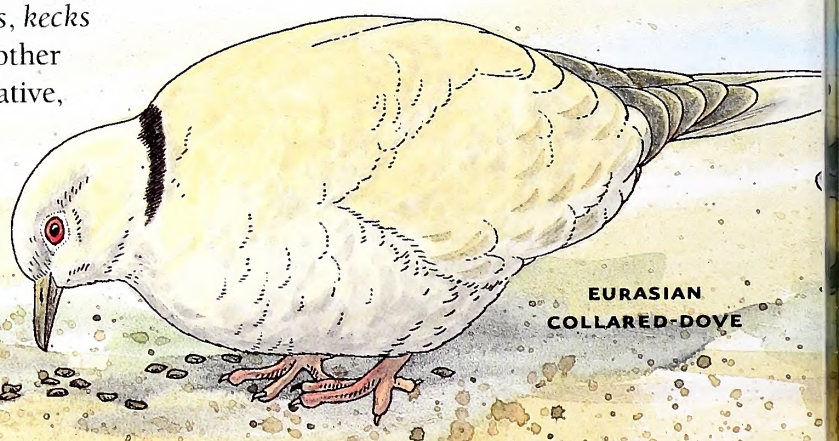
What's the difference between a pigeon and a dove? There are no strict, scientific distinctions, but pigeons tend to be larger, with short, blunt tails. Doves, including North Carolina's mourning doves, usually have pointed tails.

The world's pigeons and doves vary greatly in plumage as well as size. Some species have bright, colorful feathers, but most pigeon relatives in North Carolina sport feathers in browns, grays and other quiet colors. Learning particular calls can help you recognize species, from the soft *woo-woo, woo-woo* of a ground-dove to the loud *coo-uh-cuck-oo* of a white-winged dove.

Listen too for claps, rattles and other sounds from some species' wings, such as the whistle that mourning doves make at takeoff. In the 1800s, you could also have heard the *coos*, *kecks* and *kee-hos* of another North Carolina native, the now-extinct passenger pigeon.



COMMON GROUND-DOVE

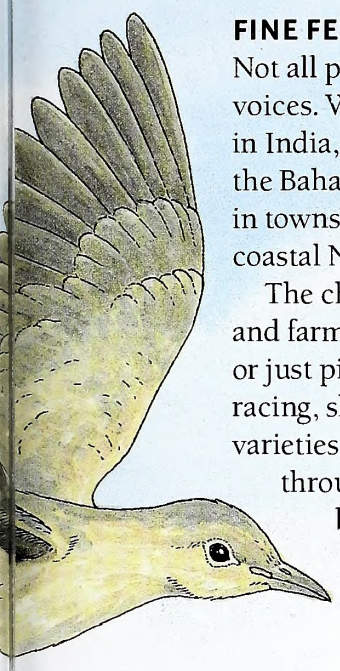


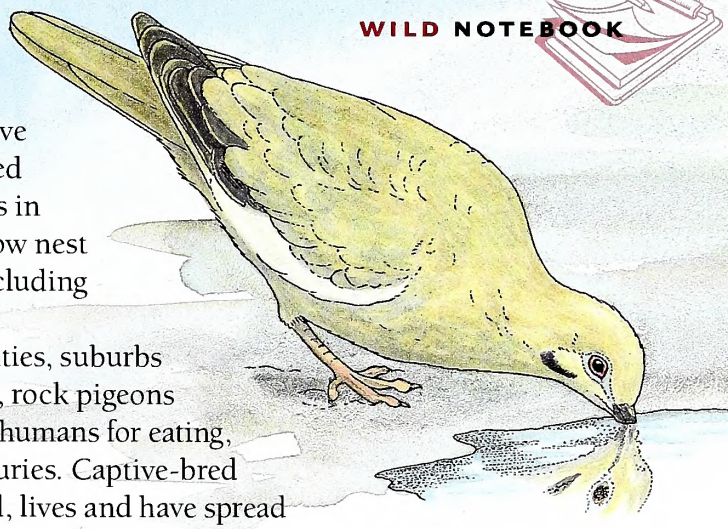
EURASIAN COLLARED-DOVE

FINE FERAL FRIENDS

Not all pigeons and doves you hear may be native voices. Wild Eurasian collared-doves originated in India, but in the 1970s, dozens escaped cages in the Bahamas. These birds spread rapidly and now nest in towns and suburbs from Florida to Texas, including coastal North Carolina.

The champion feathered invaders thrive in cities, suburbs and farms around the world. Called rock doves, rock pigeons or just pigeons, these birds have been raised by humans for eating, racing, showing and message-carrying for centuries. Captive-bred varieties sometimes escaped to live free, or feral, lives and have spread throughout the world. Bold plumages still reveal their caged-bird history, but feral pigeons behave much like their long-ago wild ancestors. They forage on the ground for seeds, and often peck up birdseed, popcorn and other human spills. As they feed, fly and nest in flocks, many eyes are on alert for city predators such as stray cats. Feral pigeons nest under building eaves and on window ledges that resemble the rocky cliffs used by wild rock pigeons.





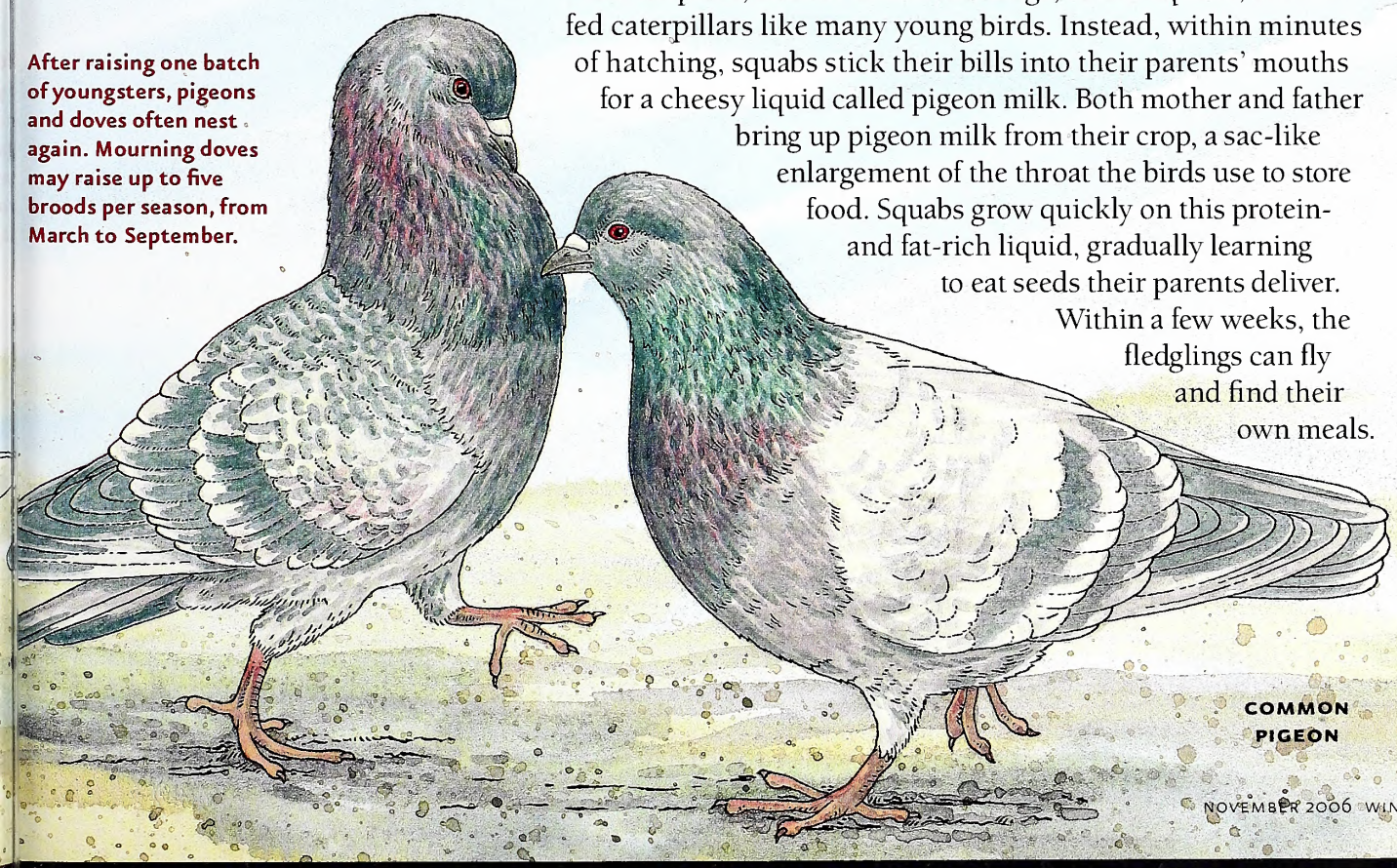
WHITE-WINGED DOVE

BIRD MILK

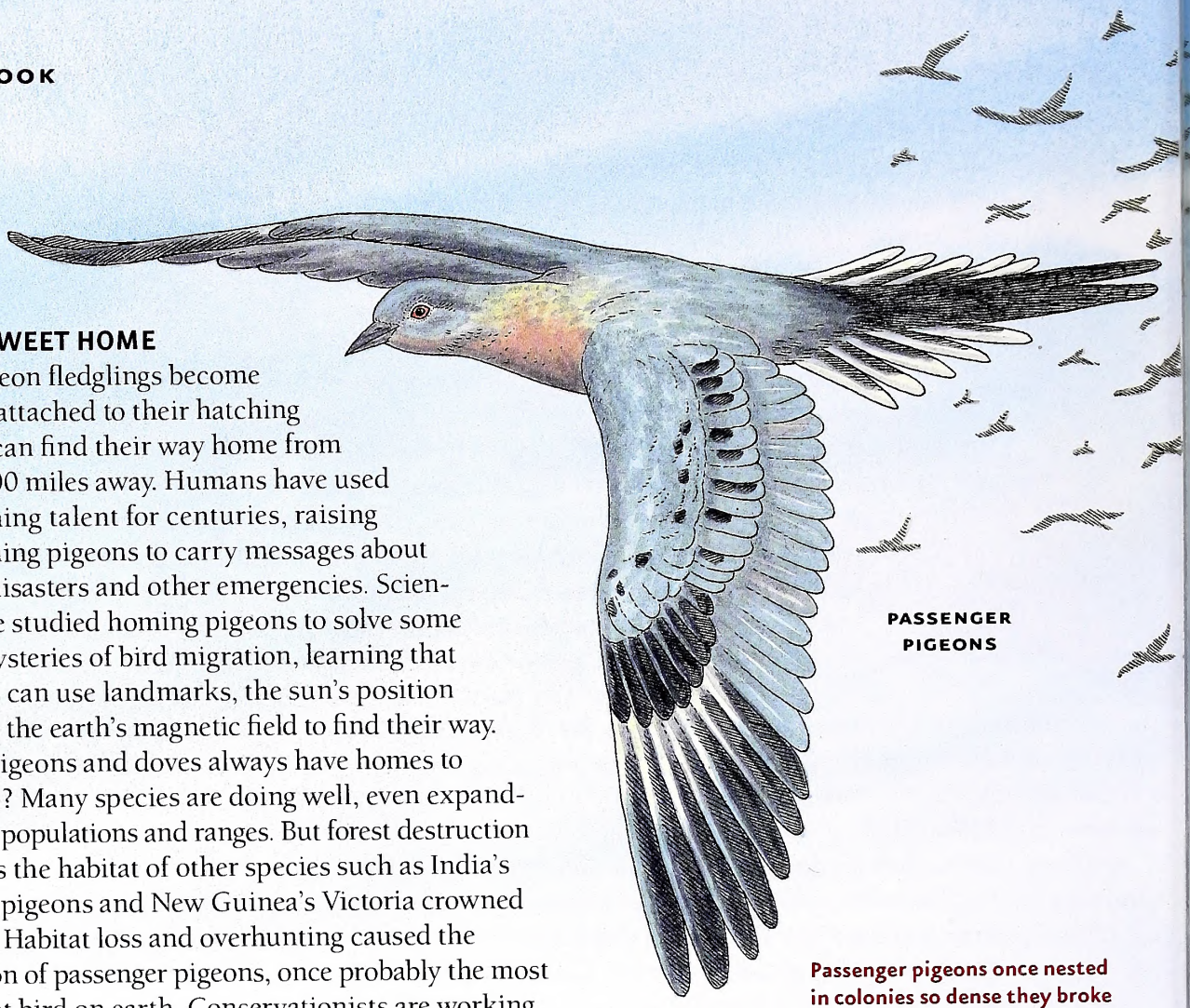
Depending on the species and habitat, pigeons and doves today nest in colonies or as lone pairs. In a lively courtship, the male struts around the female, cooing, bowing and puffing out his neck feathers. The female, in a display called "billing," tucks her beak inside the male's, and the pair bobs up and down. Soon, the male carries twigs to the female, who builds a flimsy platform where she lays one or two white eggs. Both parents take turns with incubation.

The helpless, almost naked nestlings, called squabs, are not fed caterpillars like many young birds. Instead, within minutes of hatching, squabs stick their bills into their parents' mouths for a cheesy liquid called pigeon milk. Both mother and father bring up pigeon milk from their crop, a sac-like enlargement of the throat the birds use to store food. Squabs grow quickly on this protein- and fat-rich liquid, gradually learning to eat seeds their parents deliver. Within a few weeks, the fledglings can fly and find their own meals.

After raising one batch of youngsters, pigeons and doves often nest again. Mourning doves may raise up to five broods per season, from March to September.



COMMON PIGEON



PASSENGER PIGEONS

Passenger pigeons once nested in colonies so dense they broke limbs off nesting trees.

HOME SWEET HOME

Rock pigeon fledglings become strongly attached to their hatching site and can find their way home from over 1,000 miles away. Humans have used this homing talent for centuries, raising and training pigeons to carry messages about battles, disasters and other emergencies. Scientists have studied homing pigeons to solve some of the mysteries of bird migration, learning that the birds can use landmarks, the sun's position and even the earth's magnetic field to find their way.

Will pigeons and doves always have homes to return to? Many species are doing well, even expanding their populations and ranges. But forest destruction threatens the habitat of other species such as India's Nicobar pigeons and New Guinea's Victoria crowned pigeons. Habitat loss and overhunting caused the extinction of passenger pigeons, once probably the most abundant bird on earth. Conservationists are working to make sure that there will always be pigeons and doves cooing in North Carolina and around the world.

Get Outside

Be a pigeon and dove watcher. Attract mourning doves to your backyard by spreading cracked corn on the ground. Or head for a city park where pigeons hang out, pecking for food. Do all flock members get along? How does the flock react if a bird spots danger? Can you spot the courting couples? If you watch closely, you may be able to see a mourning dove carrying a twig to its nest. And by listening, you can learn some of the songs and calls of North Carolina's varied pigeons and doves. You can even sign up to collect behavior data as an official Pigeon Watcher at a website listed in Read and Find Out.

Read and Find Out

- "Pigeons" by Dorothy Hinshaw Patent, Clarion Books, 1997.
- "City Beats: A Hip-Hoppy Pigeon Poem" by S. Kelly Rammell, Dawn Publications, 2006.
- "The Sibley Guide to Bird Life and Behavior" by David Sibley, Knopf, 2001.

In *Wildlife in North Carolina*:

- "How Does a Seed-Eating Dove Feed Its Young?" by Clyde Sorenson, September 2005.
- "Survival of the Bobblehead" by Clyde Sorenson, September 2003.

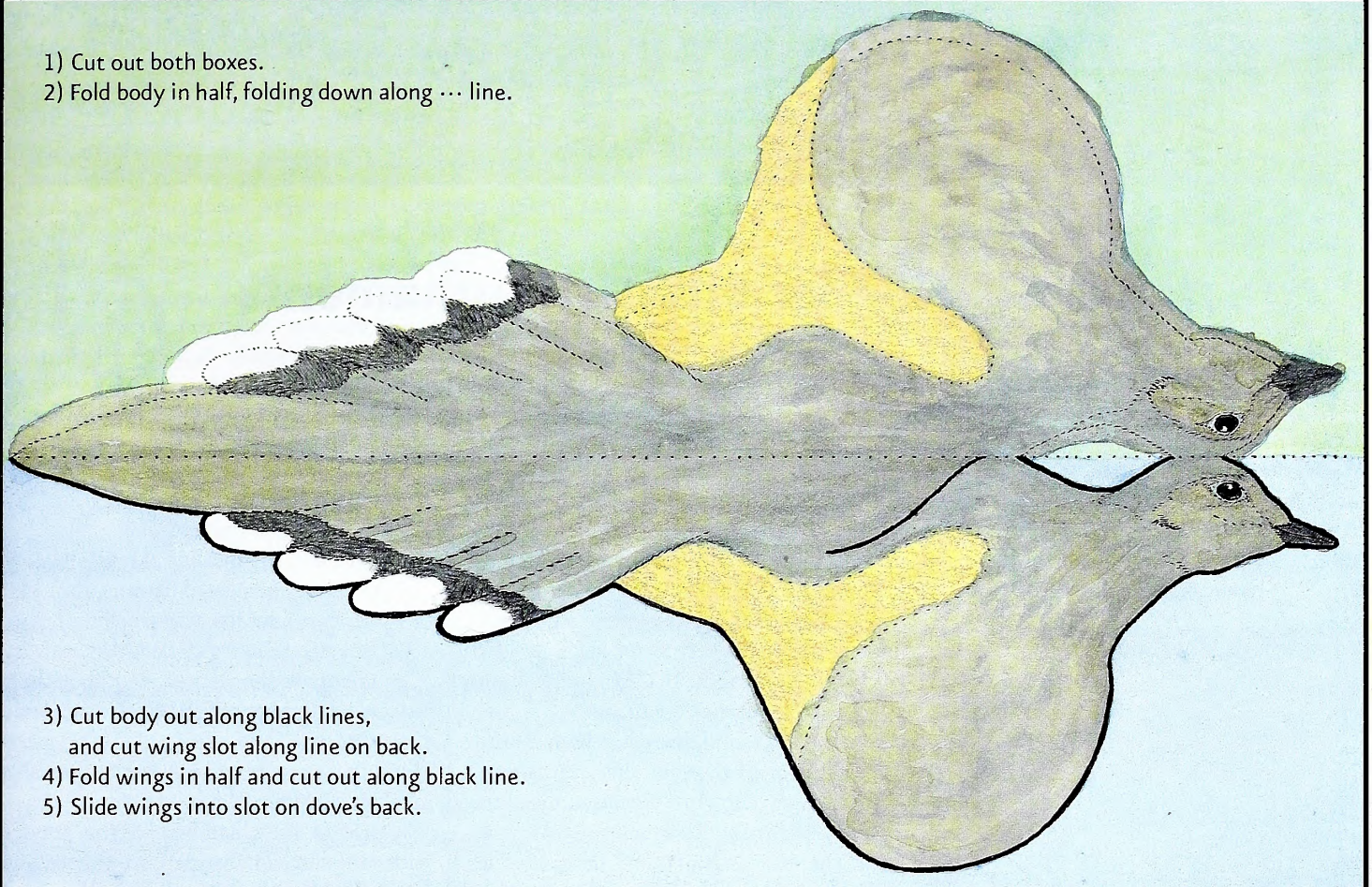
On the World Wide Web:

- Cornell University's Laboratory of Ornithology conducts Project Pigeon Watch, a citizen research project that asks participants of all ages to collect data on the behaviors of feral pigeons. Visit birds.cornell.edu/ppw.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at ncwildlife.org.

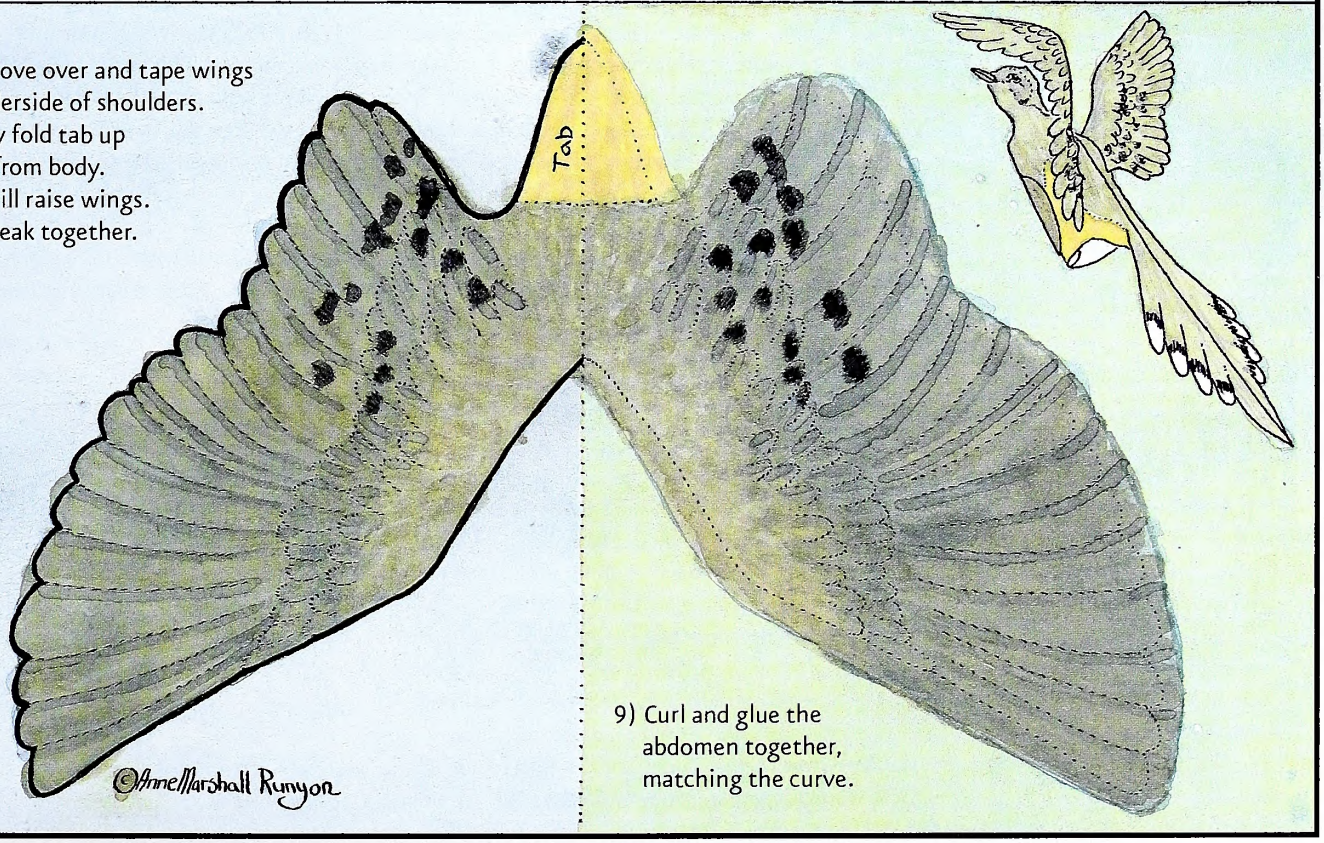
Mourning Dove Paper Sculpture

1) Cut out both boxes.
2) Fold body in half, folding down along ··· line.



3) Cut body out along black lines, and cut wing slot along line on back.
4) Fold wings in half and cut out along black line.
5) Slide wings into slot on dove's back.

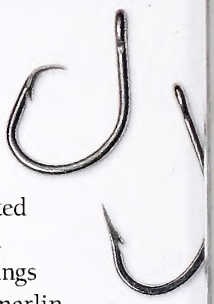
6) Turn dove over and tape wings to underside of shoulders.
7) Lightly fold tab up away from body. This will raise wings.
8) Glue beak together.



9) Curl and glue the abdomen together, matching the curve.

This activity may be downloaded at ncwildlife.org, the magazine page, and copied for educational purposes.

Circle Hooks Get Nod for Billfish Tournaments



Beginning Jan. 1, 2007, the National Marine Fisheries Service (NMFS) will require all participants in Atlantic billfish tournaments to use non-offset circle hooks when fishing with natural bait or natural bait and artificial lure combinations. Anglers will still be allowed to use "J" hooks on artificial lures.

SCOTT KERRIGAN

In addition, NMFS will limit the recreational catch of blue marlin and white marlin, both of which have been declining. To conform with United States obligations to the International Commission for the Conservation of Atlantic Tunas (ICCAT), NMFS will restrict the combined recreational catch of blue and white marlins to 250 annually. This will allow the fisheries service to adjust minimum size limits or restrict the fishery to catch and release only if the ICCAT landing limit is approached or met.

NMFS has found that while both marlin species are overfished and that overfishing is continuing, the white marlin is one of the most overfished species under ICCAT's purview. The white marlin is an Atlantic species found in temperate and tropical waters. In 2002, the United States reviewed the status of white marlins to determine if they needed to be protected under the Endangered Species Act (ESA). That was found not to be necessary at that time, but the study warned that "unless fishing mortality is reduced significantly and relatively quickly, the stock could decline to a level that would warrant ESA protection."

Marlin landings, including dead discards, by United States fishermen are small. Between 1999 and 2004, American anglers accounted for 2.4 percent of the total Atlantic blue marlin landings and 4.5 percent of white marlin landings. In 2004, United States anglers landed 149 marlins of both species.

NMFS had considered banning the catch of white marlin for five years, beginning in 2007, but elected to try circle hooks instead.

Studies have shown that circle hooks help reduce the number of fish killed by anglers practicing catch and release. One 2005 study found that circle hooks can reduce mortality in released white marlin by two-thirds or more.

Circle hooks, which first became popular with commercial fishermen, are shaped like a capital "G," with the tip of the hook pointed perpendicularly back toward the shank, forming an oval. The curve helps prevent the fish from swallowing the hook, resulting in throat-hooking or gut-hooking and causing internal injury. When fishing a circle hook, anglers simply begin reeling, and the hook lodges in the corner of the fish's mouth. With "J" hooks, an angler sets the hook by giving the rod a hard jerk. A fisherman who tries to set a circle hook will yank the hook from the fish's mouth.

ON PATROL

While working road hunting, wildlife officers Shawn Martin and Fred Hampton came up with a unique way to work their deer decoy. The decoy was placed about 35 yards from the road in a creek in water above its knees. The officers then set off for their hiding positions. After they had waited about four hours, the officers decided to call the detail a failure.

Just as Hampton was about to make his way around in the boat to retrieve the decoy, the officers heard a truck with dual exhausts and mud-grip tires slowing down. The suspect got out of his truck, put on an orange hat and went to the passenger side to retrieve his weapon. When the officers remotely caused the decoy's head to turn a couple of times, the suspect decided it was now or never. He shot the decoy twice before turning and heading for his vehicle. After the officers intercepted him, the suspect, not exactly sure of his story at this point, told Martin: "I knew it was a fake, and I was just trying to scare it off."

ILLUSTRATED BY JACKIE PITTMAN

Catawba-Wateree Agreement Will Aid Wildlife

Representatives from 70 local governments, state resource agencies, environmental groups and others signed an agreement in August to help facilitate renewal of Duke Energy's federal license to operate its Catawba-Wateree hydropower project in western North Carolina.

The N.C. Wildlife Resources Commission provided early and ongoing input in the relicensing process to ensure that conditions stipulated in the agreement were favorable to fish and wildlife.

Increased water flows and improved water quality conditions, particularly in the Catawba River below Lake James, will provide better habitat for fish, mussels and other aquatic wildlife. "Trout and other fish in this river section will benefit from increased dissolved oxygen during the summer when conditions are typically the most severe," said Chris Goudreau, hydropower licensing coordinator for the commission. "We hope to see more trout grow to catchable size in this reach."

Mussels should benefit through increased flows in the 6-mile Catawba River bypass below Lake James. Since 1919, when Lake James was completed, flow in the bypassed reach has been reduced to very low levels. While six species of mussels in this area have held on for nearly 90 years, additional flow is expected to give the mussels an opportunity to increase their numbers and distribution in the river.

Hunters, anglers, boaters and other outdoor enthusiasts will also benefit through the acquisition of more than 4,000 acres of prime wildlife habitat and additional boating access and public fishing areas. "We expect better fishing, waterfowl hunting and wildlife viewing, particularly on the Catawba River below Lake James and Lake Hickory and on the Johns River," Goudreau said. "The agreement calls for several new boating access areas and public fishing areas in these river reaches as well as on each reservoir."

NCWRC

Many of the existing boating and fishing access areas will be improved or amenities will be added, such as picnic areas, trails, swimming beaches, restrooms and lighting. Higher lake levels during the spring and fall on some reservoirs will allow boaters to enjoy their recreational activities for more of the year.

As part of the agreement, Duke Energy will help the commission purchase more than 2,800 acres along the Johns River. This land will become a part of the commission's game lands program and will be open to hunting, fishing and wildlife viewing.

The commission also will be managing the land to improve habitat for nongame species—animals that are neither hunted nor fished—by installing bat houses, protecting heron rookeries, monitoring eagles and protecting bog turtle sites. "The biggest challenge during the process was to look forward 50 years and try to balance the competing needs for the limited amount of water," said Goudreau.

IN SEASON

This month, these hunting seasons are open in North Carolina:

Bear: See *2006–2007 N.C. Regulations Digest* for dates and locations.

Bobcat: Through Feb. 28.

Crow: Wednesday, Friday and Saturday of each week between June 1, 2006 and Feb. 28, 2007, plus Thanksgiving and Christmas.

Fox: Runs Nov. 18–Jan. 1.
See *Regulations Digest* for locations.

Mourning Dove: Runs Nov. 20–25.

Opossum and Raccoon: Through Feb. 28.

Pheasant: Runs Nov. 18–Feb. 1.

Quail: Runs Nov. 18–Feb. 28.

Rabbit: Runs Nov. 18–Feb. 28.

Rails, Gallinule and Moorhen: Through Nov. 9.

Ruffed Grouse: Through Feb. 28.

Squirrel: Red and gray season through Jan. 31. Fox squirrel season through Dec. 31 in selected counties.

White-tailed Deer: Western gun season runs Nov. 20–Dec. 9. In the Northwest, muzzleloading season runs Nov. 11–17 and gun season Nov. 18–Dec. 16. Central muzzleloading season from Nov. 4–Nov. 10 and gun season from Nov. 11–Jan. 1. Eastern gun season continues through Jan. 1.

Wild Boar: Through Nov. 18.

Migratory Waterfowl

Canada Goose: Resident Population season runs Nov. 11–Dec. 2; South James Bay Population runs Nov. 11–Dec. 30.

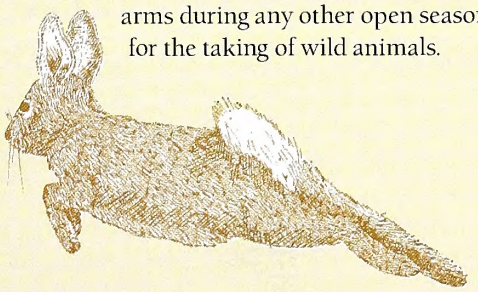
Ducks, Coots and Mergansers: Runs Nov. 11–Dec. 3 (Black and mottled duck seasons closed until Dec. 1; harlequin duck season closed).

Sea Ducks: Through Jan. 27.

Snow, Blue and Ross' Geese: Nov. 11–March 3.

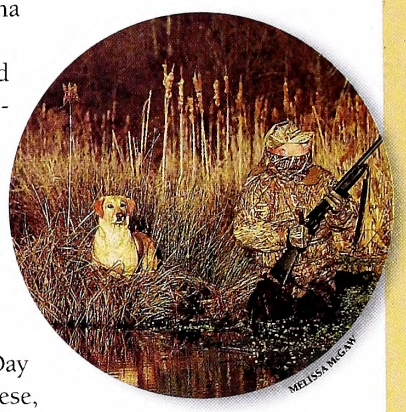
Tundra Swan: Runs Nov. 4–Jan. 31 by permit only.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria, except that nutria may not be shot in Currituck County during open seasons for migratory waterfowl. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.



Waterfowl Hunters Will See Few Changes in New Seasons

North Carolina hunters will find few changes in the 2006–07 waterfowl seasons as established by the N.C. Wildlife Resources Commission. The frameworks provided by the U.S. Fish and Wildlife Service allow North Carolina a 60-day duck season and six-bird daily bag limit.



Hunters will be able to include one additional hooded merganser per day this season, for a total of two. Canvasback season also runs concurrent with the other duck seasons. Last year that season did not open until Dec. 26.

Last year's reduction in the daily bag limit to two scaup per day will remain unchanged. "The scaup population has experienced a significant long-term decline, and this year's estimate is the lowest on record," said Fish and Wildlife director H. Dale Hall.

The commission also set Feb. 3 as Youth Waterfowl Day for hunters age 15 or younger. Species include ducks, geese, mergansers and coots. Participants must be accompanied by an adult age 21 or older, who is not allowed to hunt.

Daily bag limits under the federal frameworks (possession limit is twice the daily limit, unless otherwise noted) are as follows:

Ducks: six, with no more than one black duck or one mottled duck (black duck/mottled duck season is closed until Dec. 1); four mallards with no more than two hen mallards; four scoters; two wood ducks; two redheads; two scaup; one canvasback; one pintail; and one fulvous tree duck. The season on harlequin ducks is closed.

Light geese (includes snow, blue, and Ross' geese): 15, with no possession limit; Brant: two; Coots: 15; Mergansers: Five, only two of which can be hooded mergansers.

Sea ducks: seven in special sea duck area only. In other areas, sea ducks are part of the regular bag limit. No more than four scoters per day can be taken in either the regular duck season or special sea duck season.

Bag limits for Canada and white-fronted geese (in aggregate) vary by time and zone: Resident Zone: five; Southern James Bay Zone: two; Northeast Hunt Zone, permit only: one per season with permit. Shooting hours will be from one half-hour before sunrise to sunset. For more information about waterfowl hunting regulations in North Carolina, see the hunting regulations page at ncwildlife.org or call (919) 707-0050.

North Carolina's duck seasons run as follows:

Ducks, coots and mergansers: Nov. 11–Dec. 2; and Dec. 16–Jan. 27

Special sea ducks, in special sea duck area only: Oct. 4–Jan. 27

Brant: Dec. 25–Jan. 27

Light geese (snow, blue and Ross' geese): Nov. 11–March 3

Tundra swan: Nov. 4–Jan. 31. Hunting is by permit only; 5,000 permits will be issued.

Seasons for dark geese (Canada and white-fronted) vary by population zone. Goose season dates by zone include:

Resident Population Zone: Nov. 11–Dec. 2 and Dec. 16–Jan. 27

Southern James Bay Zone, Nov. 11–Dec. 30 (Gaddy Goose Refuge closed)

Northeast Hunt Zone, Dec. 25–Jan. 27.

The Northeast Hunt Zone, comprising all or parts of 11 northeastern counties, is a permit-only hunt with a season limit of one bird per hunter; 1,000 permits will be issued, double the number issued last season.

CALENDAR OF EVENTS

Saturday, Nov. 4

Improve your fly-fishing skills with Introduction to Fly-Fishing at the Pisgah Center for Wildlife Education near Brevard. Topics covered include equipment, casting techniques, aquatic ecology and fly identification. Clinic runs from 10 a.m.–4 p.m., and is limited to eight participants. Visit ncwildlife.org or call (828) 877-4423.

Tuesday–Sunday, Nov. 7–12

Discover the diverse habitats and wildlife of the Outer Banks at Wings Over Water in Kill Devil Hills. Participants may bird and paddle the marshes and coast, listen for red wolves and watch for bears in pocosin forests and open fields. Visit wingsoverwater.org or call (252) 441-8144.

Thursday, Nov. 16

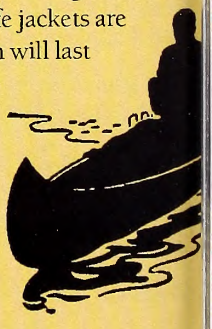
Learn about coastal birds with a birding tour of the Fort Macon State Park area at Atlantic Beach. Tour begins at 9:30 a.m. Contact (252) 726-3775.

Saturday, Nov. 18

Compete for fun and prizes and help contribute to college scholarships for local students in the Rockfish Rodeo in Manteo. For more info, visit rockfishrodeo.com or call (252) 441-7887.

Saturday, Nov. 25

Join a park ranger at the William B. Umstead State Park Boathouse (located off U.S. Hwy 70 near Raleigh) at 10 a.m. for a canoe trip around Big Lake to view wildlife in natural surroundings. Canoes, paddles and life jackets are provided. This program will last 1½ hours. Basic canoe skills are a must. Reservations are required, and trip is limited to 10 people. Call (919) 571-4170 for more information and reservations.

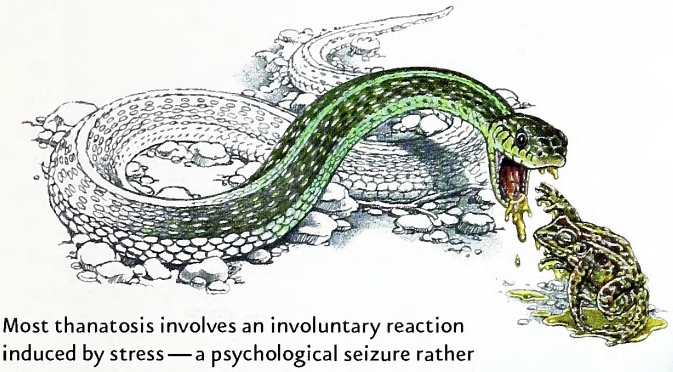


Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

How Can "Playing Dead" Stop A Predator?

written by Jeff Beane
illustrated by Jim Brown

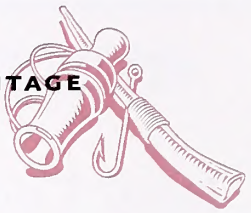
DEATH FEIGNING, ALSO CALLED TONIC immobility or thanatosis, is a common defensive strategy. It's tempting to think playing dead might simply make a predator's job easier. But in some predators, attack behavior is triggered by movement and struggle. An animal that suddenly "dies" may stop some predators cold.



Most thanatosis involves an involuntary reaction induced by stress — a psychological seizure rather than a conscious act of deception. It's often accompanied by analgesia (increased pain tolerance), which enhances an animal's ability to remain immobile while being bitten or otherwise abused. Frogs that feign death while being eaten by snakes are more likely to be swallowed alive and uninjured — struggling increases their risk of serious injury. If the snake later regurgitates because of the frog's skin toxins or some other reason, the frog may survive.

Animals exhibiting unexpected behaviors when attacked — known as protean behavior or proteanism — may so thoroughly bewilder a predator as to override its attack response. Some animals, such as hognose snakes, even manage to "smell dead" by regurgitating and/or voiding musk, urine or feces. Predators that typically pursue living prey, scavenging only when desperate, may abandon a potential meal that suddenly transforms into apparent carrion.

Death feigning isn't always successful, but it works well enough to be practiced by many insects, amphibians, reptiles, birds and mammals. One of the most ancient and successful mammals of all is also the most famous for "playing 'possum."



Fear Factors

written by Jim Dean

Hollywood raked in some serious cash this past summer with the creepy movie "Snakes on a Plane." The formula for a successful summer blockbuster nowadays is to combine our worst phobias with the most unlikely scenario—in this case, an unreasonable fear of aggressive "no-shoulders" paired with helpless claustrophobia at 30,000 feet—then wait for all heck to break loose. If we don't find the predictable result to be campy fun, at least the theatres are air-conditioned.

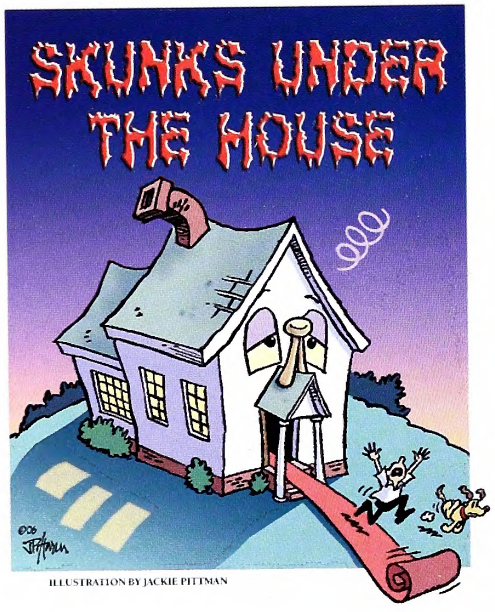


ILLUSTRATION BY JACKIE PITTMAN

I think we all now know pretty much what to expect next summer, too—tight quarters shared with lots of creepy-crawlies. Just in case the producers have trouble thinking of plots, maybe I can be of assistance. During the more than 50 years I have been camping, fishing and hunting, I've run into more than a few promising scenarios. How do these sound to you?

"Black Widow Spiders in the Outhouse," "Scorpions in your Shoes," "Skunks Under the House", "Chiggers and Ticks in Your Tightie-Whities" or "Half a Roach in Your Reuben." Is your skin crawling yet? By the way, these all derive from recent personal experience, so if they appear in a movie title next year, remember that you saw them here first. I may need witnesses.

"A poisonous snake was loose in the car, it was getting dark and they were miles from even a service station."

Alas, I can't claim ownership of some of the best plots since I was not personally involved. I'm particularly thinking of "Fingers in Your Chili." And I suppose "Rats in Your Car" properly belongs to Hamilton Jordan, chief of White House staff during the Jimmy Carter presidency. It was reported that when he was in college, Jordan lived for a semester or so in his Corvair, and that it became infested with rodents. Likewise, you'd probably have to admit that "Asps in your Bra" and "Serpents in your Hair" belong to the classics—Cleopatra and Medusa, to be more specific.

Some of my fishing buddies could, through misfortune, add to this list. Years ago, Andy Aretakis was part of the usual overflow crowd that gathered for opening day of the trout season at Alvin Johnson's mountain cabin. Eventually we all went to bed, and Andy rolled out his sleeping bag on the floor. Soon after he had joined the modulating chorus of snorers, several wasps crawled in with him (probably seeking a quieter spot). When Andy rolled over on them, they objected as only a wasp might. "Wasps in your Sleeping Bag" proved so scary that we didn't even laugh at Andy (at least not right away).

On another trout-fishing trip, Tom Cooper and I witnessed a moment of pure terror at a burger joint in Lenoir when we stopped for supper. A woman with a beehive hairdo was standing under the lights at the window waiting for service when a rhinoceros beetle (roughly the size of a big lemon) buzzed through the lights and landed in her hair. She was still in a catatonic state when we scooped the beetle into a milkshake cup and drove away, delighted to add such a magnificent critter to our collection.

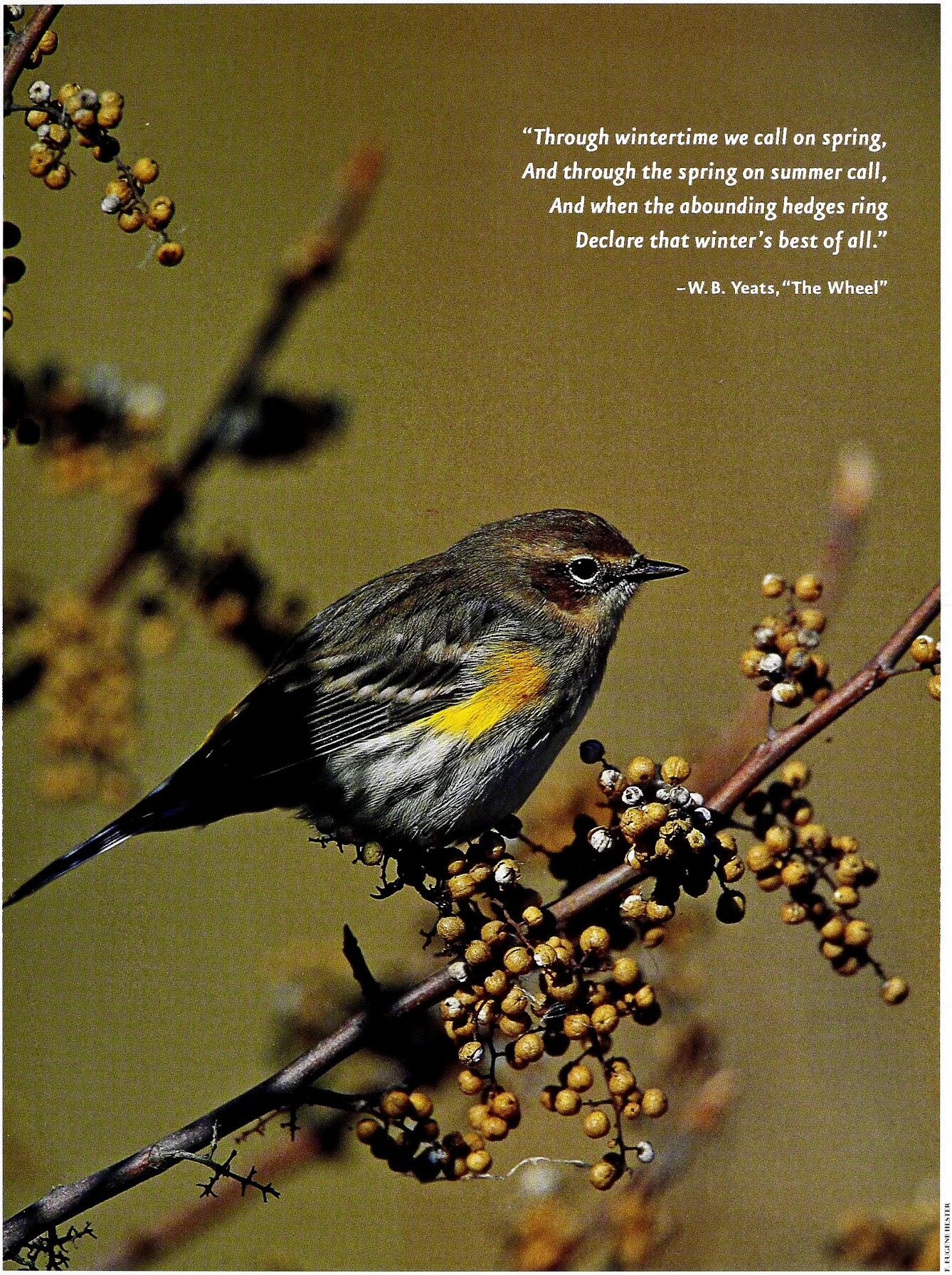
Then, there's what I regard as the granddaddy of all fear-factor stories—"Coral Snakes (Not) in the Cooler." Bill Palmer was curator of herpetology at the N.C. Museum of Natural Sciences for many years, and he told me about an incident that took place long ago. While on one of his frequent trips to study snakes, he and a photographer found a particularly handsome coral snake. These snakes are secretive and infrequently encountered, but while they are deadly poisonous, their mouths are small and the teeth that inject the toxin are toward the back of the mouth.

"They can kill you, but they don't have the big fangs to deliver the poison as efficiently as a rattler or cottonmouth," Bill explained. "We put the snake in a cooler in the car so we could photograph it before turning it loose. Then, we went looking for other snakes."

Late that afternoon when they returned to the car, they flipped open the cooler to admire their snake. It was not in the cooler. A cursory inspection revealed that the drain hole (about the diameter of the snake) had inadvertently been left open. This plot was getting interesting. A poisonous snake was loose in the car, it was getting dark and they were miles from even a service station.

The front and back seats were cautiously removed, and the car turned virtually inside out. No snake. "Maybe it managed to squeeze through a gap in the floorboards," they speculated. Maybe.

Eventually, they drove home nervously. The snake was never found. This is, of course, a true story (like all the others you read here). Perhaps next summer you can settle down with a tub of popcorn and enjoy one of them. There is, however, one sequel you won't see—"Snakes in a Dark Theatre."



E. EUGENE HESTER

Yellow-rumped warbler

OUTDOOR MOMENT

IN THE DECEMBER ISSUE

DERRICK HAMRICK

100 YEARS OF DEER HUNTING

Check your egos and your big-buck lust at the door of the century-old North State Game Club. This Bladen County institution is all about fellowship.

COUNTING AND CAMARADERIE

The Christmas Bird Count, the oldest wildlife survey in the world, is rich with tradition, wacky weather and wild stories of challenging bird surveys.

GOLDEN YEARS

Avid wildlife photographers Gene Hester and Jack Dermid have a friendship that goes back more than 50 years. As always, the photos tell the story.

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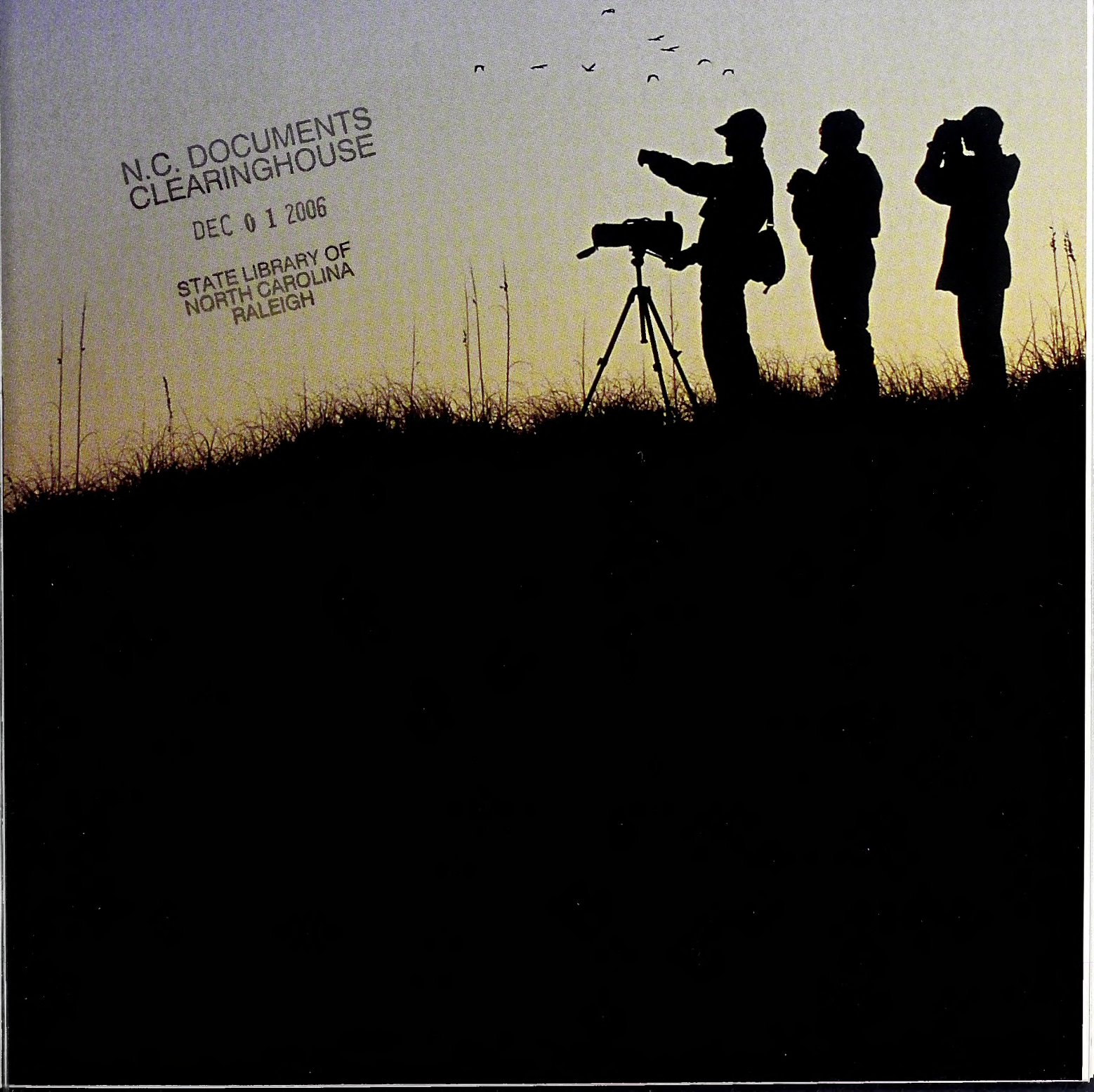
WILDLIFE IN NORTH CAROLINA



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The peregrine falcon is one of the uncommon species biologists from the N.C. Natural Heritage Program look for to identify habitat conservation needs.
PHOTOGRAPH BY MASLOWSKI PRODUCTIONS.

Volume 70 | Number 12

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Cover: Participants in annual Christmas Bird Counts often enjoy the opportunity to spend time with friends as much as the counting itself. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Trapped in the office on a sunny afternoon, many of us pine for the ability to ditch work and head out to a favorite fishing hole, hiking trail or tree stand. We might even call friends and attempt to entice them into truancy. Why? Because spending time outdoors is better with friends.

Jack Dermid and Gene Hester have each spent countless hours photographing wildlife in remote locations, often with no sign of other humans around. But ask them to talk about their favorite days afield, and they tell story after story about spending time with one another ("The Golden Boys," page 10). As in the case of Dermid and Hester, even if you aren't together all day it is fun to have someone to talk to later about your experiences.

DERRICK HAMRICK

A fireside chat at the North State Game Club.

For the members of the North State Game Club, that's a huge part of what their hunting experience is all about ("The North State Way," page 22). For 100 years, a stay there has consisted of doing a little hunting and a lot of hanging out. The club's favorite traditions are based on making good-natured fun of one another—something that's difficult to enjoy alone.

The Christmas Bird Counts that Jeff Beane writes about in "Out for the Count" (page 4) are social occasions that all of the participants look forward to each year. Given the parties, special food and drink, and storytelling, it's no wonder that some birders take part in counts in several different places each year.

Learning in the outdoors is a bonding experience that is not to be missed either. The three stooges of "Greenhorn Waterfowl Hunting" by Jonathan Hewitt (page 28) will never forget the foibles and funny experiences they shared while learning to duck hunt. So grab your gear and a friend or two, and get outside. Your time afield will be much more enjoyable when enhanced by a spirit of friendly good fellowship.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

DECEMBER 2006 VOLUME 70, NUMBER 12

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Stories Deer To Me

I really enjoyed the articles about deer hunting in the October issue ("Pisgah Forest's Good Old Days" and "What About the Venison?"). I'm 13 years old and my dad and I are planning to go on our first deer hunt this fall. If we get lucky, my mom is going to try some of the venison recipes. The article about Opening Day at Pisgah Forest was really special to me because I have an old newspaper clipping and a photograph of my great-grandfather, Dewey Joyner of Mocksville, with a 115-pound buck he took in Pisgah on Nov. 19, 1951. I look forward to every issue of your magazine.

Graham Joyner
Wake Forest

'Epicurious' About Venison

I certainly enjoyed Scott Belan's article in the October issue ("What About the Venison?"). Like him, I love the taste of venison, but don't hunt. It is almost impossible to find someone willing to share his or her kill(s) and, therefore, I rarely get to cook venison. Why can't we have game grocers like the ones I've visited in the United Kingdom? These stores, in almost every English or Scottish town, carry rabbit, pheasant and most other common game meats, including venison. They are closely regulated and their products appeared to be top quality.

Herb Stanford
Morehead City

NCWRC deer biologist Evin Stanford: State statute G.S. 113-291.3(b)(8) states, "The edible parts of deer raised domestically in another state may be transparted into this State and resold as a meat product for human consumption when the edible parts have passed inspection in the other state by that state's inspection agency ar the United States Department af Agriculture." The N.C. Wildlife Resources Commission has a rule that states, "The sale of edible portions or products of game birds and game animals is prohibited, except as may be otherwise provided by statute." With the exception of the above-mentianed statue pertaining to domestically raised deer from other states, there are no ather provisians that allow far the sale of meat products from game birds or animals. These rules ensure that wildlife populations are not commercialized and thus exploited, such as the case when market hunting was popular and led to declines in many wildlife populations.

Scott Belan: Try the Internet. There are places that sell domesticated venison retail and will ship it anywhere, as a quick online search for "venison for sale" will attest. Restaurants buy venison from wholesalers just like pork, beef, etc. I'd guess there isn't enough interest here in the States to have a "game section" of the supermarket meat counter. I wish there were. Wild game is something we as an eating culture just don't particularly value, sadly enough.

Tail Wags the Fish?

I can hardly wait until we purchase our saltwater fishing license and they use our funds to take all the surveys discussed in the October issue ("License to Manage"). I am sure that the ocean will be teeming with red drum and speckled trout as a result of the surveys. Since the surveys will improve saltwater fishing, I would suggest that the state close its trout hatcheries and start taking surveys of fishermen wading mountain streams in search of native trout. I would also suggest the hatcheries producing bass, sunfish, stripers, hybrids, etc. be closed. Just think how much money could be saved, and fishing improved, with surveys. By the way, you might want to check with the fishermen in Texas on how much their fishing has improved since opening saltwater hatcheries. I also read that South Carolina has started a saltwater stocking program.

W. Eugene Foster
Sunset Beach

Getting Mushy

I enjoyed reading Mark Joyner's article "Mushrooms of Fall" in the October issue. I am not versed on mushroom species in general, but I am very familiar with the edible species called chanterelles. It is similar in color to the jack-o'-lantern. Chanterelles have a fluted cap, septa that extend along the stem, and they grow on the ground, but not usually in clusters or on trees. The flavor is peppery and the juvenile form is about the same as the adult. I found delicious ones in the woods around New Bern.

You identified the "foolproof four," but I did not see chanterelles among the group. Perhaps they are actually one of the four species you listed and you simply used another name for it. I also noticed that no pictures of the three edible mushrooms were shown. Perhaps you did not want anyone to make a misidentification.

Aaron Chauvin
New Bern

Mark Joyner: Yellow-orange chanterelles are indeed common in our state. They are considered by many to be the world's best edible mushroom, with a fruity arama and a samewhat peppery taste. They are often found growing under aaks and beech trees, but identification can be risky because of the close resemblance to the poisonous jack-o'-lantern mushroom. For this reason, they are NOT one of the "foolproof four" which are puffballs, inky caps, morels and the sulfur shelf.

write us

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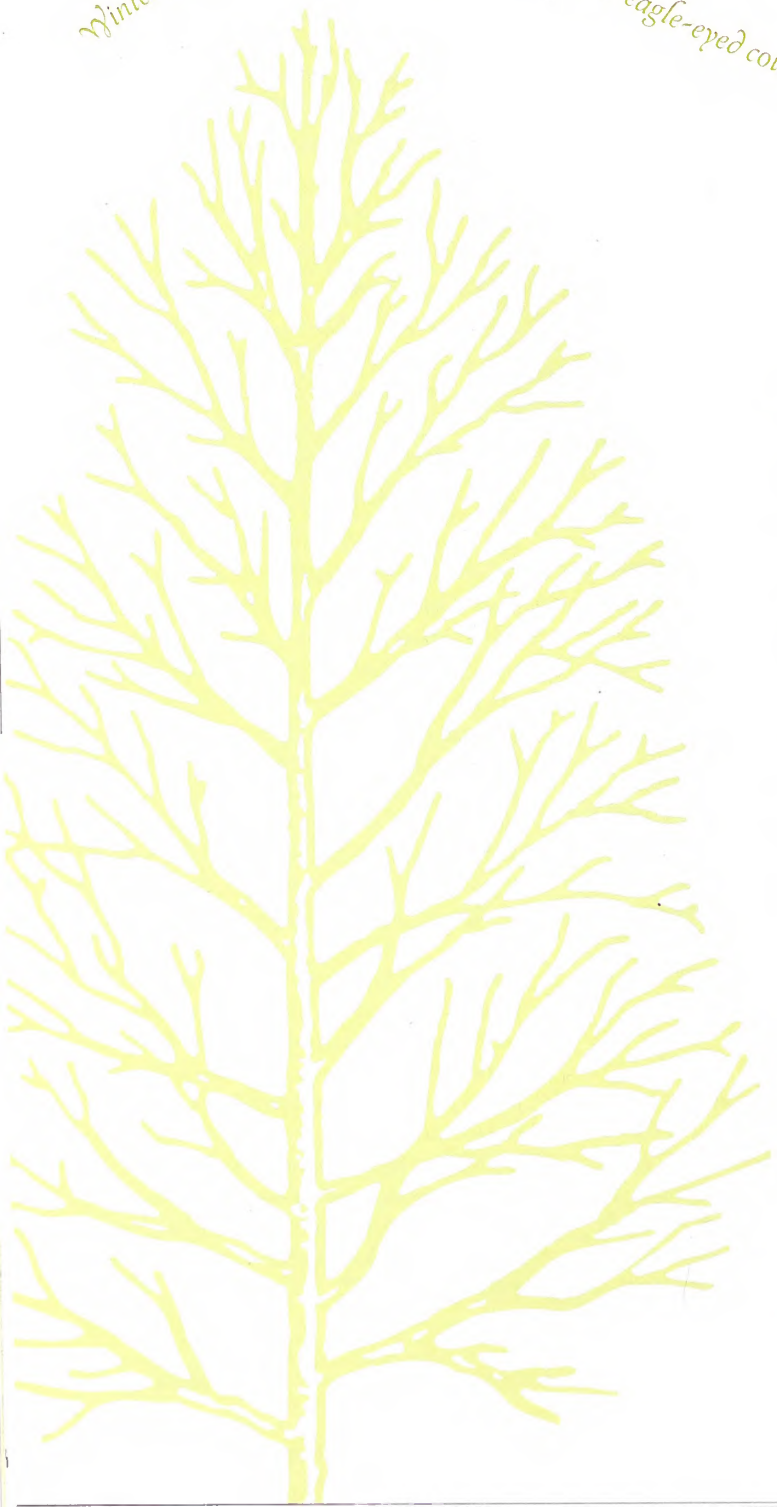
Out *for the* Count

written by Jeff Beane ✧ photographed by Todd Pusser

Winter tradition mixes friends, fellowship and eagle-eyed counters to provide data on bird populations.



Each year, around December, I undergo a minor transformation—nothing life-altering, mind you—just a slight focal shift. It has little to do with the holiday season, although it coincides with it. For herpetologists (folks who spend most of their time thinking about reptiles and amphibians) like me, winter is not strictly downtime—there are winter-breeding amphibians and certain other herpetologically oriented winter pursuits.

But it is a slower time, and it's during that slight lull that I ease into what some might consider a very un-herpetologist-like activity: I watch birds. Not only that, I count them. That is not to imply that I ignore birds during other seasons—I carry binoculars year-round. If it's alive, pay attention to it—I've always said that. But for several days in December and early January, I immerse myself in a phenomenon known as the Christmas Bird Count (CBC).

The Christmas Bird Count is the oldest and largest wildlife survey in the world. Sponsored by the National Audubon Society, CBCs are held annually, from Dec. 14 to Jan. 5, mostly in the U.S. and Canada, but also in at least 15 other countries. Over 2,000 regional counts are now held, with more than 50,000 participants turning out each year, and those numbers continue to grow.

The basic purpose of CBCs is to census bird populations. Each regional count covers a "count circle" 15 miles in diameter, or about 177 square miles. Like so many great efforts, CBCs run on volunteer power. Participants divide into teams, each of which covers

a certain assigned portion of the circle as thoroughly as possible. Usually one person serves as coordinator, in charge of organizing participation, compiling results and submitting the final data to National Audubon. Each participant is asked to contribute a $5 fee to assist in compiling and publishing the results. Count summaries are published in *American Birds* each year.

The ideal objective is to identify and tally every single bird within the count circle in 24 hours—midnight to midnight on the chosen date. Realistically, this can't be done, but the idea is to come as close as possible, identify the majority of species present and obtain reasonable estimates of the numbers of each. It's virtually impossible to accurately count the loose flocks of yellow-rumped warblers constantly flitting through the juniper and wax myrtle thickets along the coast, or the white-throated sparrows or song sparrows skulking in old Piedmont fields or even small, shifting flocks of active, mobile birds like crows and doves that may constantly move back and forth over an entire survey area. But birders do have fun trying.

Protest against slaughter

Ornithologist Frank M. Chapman is credited with founding the CBC. Through the 19th century, and prior to the existence of laws protecting migratory birds, annual holiday "side hunts" were a popular tradition in which teams competed to see how many birds and other animals they could shoot in a single day. Outraged by this waste and concerned about declining bird populations, Chapman counted live birds for three hours as a protest on Christmas Day of 1899. He published the results in his newly created *Bird-Lore* magazine, and encouraged other bird enthusiasts to count live birds. The following year the first national count was held, with 27 participants counting birds in 25 locations. It's been held every year since, with this year's 107th annual count promising to be the largest yet.

Audubon's Christmas Bird Count is the world's largest wildlife survey, with more than 50,000 participants each year.

LOGGERHEAD SHRIKE
Lanius ludovicianus

The Christmas count lets ordinary citizens contribute data on birds from such places as Bodie Island and Pea Island.

North Carolina has nearly 40 different CBCs. Some of the oldest and largest—like the Raleigh count organized by Wake Audubon—may have more than 70 participants. Many individuals participate in multiple counts. Among North Carolina's busiest Christmas counters are veteran birders such as Ricky Davis and John Fussell, each of whom helps with as many as seven or eight counts each year. "I'm sure one day I'll drop back," said Davis, who has participated for 30 years and currently edits North Carolina's CBC summaries for National Audubon. "But at this time, I still enjoy them enough to go through the hassles of scheduling and travel."

The all-time record for CBC participation may belong to Paul Sykes, a biologist with the U.S. Geological Survey's Patuxent Wildlife Research Center in Athens, Ga. Since 1953, Sykes has participated in a total of 370 CBCs in seven Southeastern states—including a couple each year in North Carolina. He organizes the Hatteras and Bodie-Pea Island counts, and has done the latter for 40 years.

Another remarkable record belongs to retired N.C. State zoology professor Tom Quay, who has taken part in the Raleigh count nearly every year since 1938 (the second year it was held). His mark of 67 nearly consecutive years (he missed a couple of years while stationed overseas during World War II) may well represent the all-time record for long-running CBC participation.

KILLDEER
Charadrius vociferus

TUFTED TITMOUSE
Baeolophus bicolor

Citizen contributions

CBCs are excellent opportunities for ordinary citizens to gather data that are meaningful to the overall body of knowledge about birds. They are probably the best-known such examples of citizen science in the world. No one harbors illusions that the counts are precise tallies of bird populations. It's the sheer volume of data and the consistency of holding the counts in the same areas, during the same seasons, often with many of the same participants, year after year, that make the information valuable. Bird count data can definitely depict trends and population fluctuations over time. Some studies have shown that the data gathered on CBCs correlate very closely with those gathered via more rigorous survey methods.

Anyone can participate in a CBC. Expertise is not required—novices may join groups with more experienced birders.

Spring Bird Counts, targeting migratory birds, are also held each year, usually in late April or early May. Survey methods are essentially the same as for CBCs, and the same count circles are normally used, but the spring counts are fewer, not as well organized and have not been conducted for nearly as long as CBCs. Some maintain that spring count data are less meaningful, since individual migrants are apt to be counted in multiple areas. Other citizen science bird programs (variously sponsored by National Audubon, Cornell Lab of Ornithology and the U.S. Geological Survey) include North American Breeding Bird Survey routes, Project FeederWatch, eBird and the Great Backyard Bird Count (held for four days in February each year and quickly growing in popularity). But the Christmas counts have remained the most popular and attracted the most participants.

Anyone can participate in a CBC. Expertise is not required—novices may join groups with more experienced birders. Even physically handicapped persons may participate by watching bird feeders within the count circle. Some participants prefer this method, and most counts include some data from individuals who only record birds visiting their feeders or yards.

Bird counts are also social events, and many people participate primarily for that reason. It's fun and exciting to go out with a small group of friends and count birds, then compile your results and compare them with the other groups—or your own from previous years. Most counts consist of several hours of birding, usually from dawn to around midday. But some may last all day, including several hours of predawn and after-dark "owling." There are usually some birders who want to count longer; these hard-cores usually spend the afternoon and evening covering areas of the circle not covered by others, or they may try to spot species that were missed earlier in the day. Some counts have midday tallies to

Each regional count covers an area 15 miles in diameter. Participants divide into teams to cover the 177 square miles.

RED-TAILED HAWK
Buteo jamaicensis

check on which areas still need coverage or what species need to be targeted in the afternoon. Many end with a potluck dinner or social accompanying a final group tally or countdown.

For the past 13 years, I have participated in at least one Christmas count each season. Most years I do four—Raleigh, Southern Pines, Ocracoke and Portsmouth Island. I enjoy the two coastal counts the most. Organized by U.S. Library of Congress employee Peter Vankevich, they have become the traditions that I most look forward to during the holiday season.

My consistent and longtime partners in each year's counts are John Finnegan (N.C. Natural Heritage Program) and Stephanie Horton (N.C. Ecosystem Enhancement Program). Sometimes others join our team. On nearly every count, amid our best effort to record common species as accurately as possible, we'll turn up an unusual bird or two. It might be a black-chinned hummingbird, yellow-throated warbler or flock of common redpolls on Ocracoke, or a black-and-white warbler or American woodcock on Portsmouth. In Raleigh it could be a huge flock of rusty blackbirds, or the only pintail or catbird found on the count. Or perhaps a merlin, snow goose or white-fronted goose on the Southern Pines count.

Chance to learn

Count participants frequently witness interesting behaviors and learn new things about birds. Fayetteville attorney Hal Broadfoot, who also does several CBCs each year, recalled one count during which he watched a merlin attacking a belted kingfisher. The kingfisher retreated underwater, repeatedly diving and resurfacing in its efforts to thwart the persistent would-be predator. "It was amazing," Broadfoot said, his face alight with the sort of enthusiasm one sees only in someone deeply interested in bird behavior. "Everybody's seen kingfishers dive after prey, but I'd never seen one dive to escape a predator!"

Everyone has his favorite count traditions and associations. "Doughnuts," said N.C. Museum of Natural Sciences bird curator John Gerwin, who helps organize and compile results for the Raleigh CBC. "For some reason, Christmas Bird Counts just make

me want to eat doughnuts. I've probably eaten more doughnuts during bird counts than all other times in my life combined."

One of my personal favorite CBC traditions—besides being ferried to Portsmouth Island in Rudy Austin's boat—is the final tally of the back-to-back Portsmouth and Ocracoke counts. It's held at Vankevich's house on Ocracoke, and frequently features Lloyd Lewis' crab cakes and smoked eel, Tom Wright's venison stew and, best of all, Vankevich's key lime pies. John, Stephanie and I originally began participating in those counts to provide a little more North Carolina representation (most original participants were, like Vankevich, from the Washington, D.C., area). You could say we came for the counts, but we stayed for the food and friendships. Some years Peter will slip me a whole key lime pie to take home, though it usually doesn't make it that far. After our seventh year of those two counts, he gave us shirts he'd had especially made, with "Portsmouth Is. Christmas Bird Count" or "Ocracoke Is. Christmas Bird Count" embroidered over the left breast. You don't get to be any more a part of a bird count than that.

Occasionally count experiences prove not so pleasant. During the 2005 Henderson County CBC, Elisha Mitchell Audubon Society president Marilyn Westphal learned the dangers of "slack-jawed birding" as she and Nora Murdock checked a silo for the barn owl that was usually present. Said owl took issue with the intrusion and flew off, lightening its load in the process and splattering feces onto Westphal's hair, hands, coat and binoculars and—worst of all—into her open mouth. "Barn owl poop is not at all tasty," said Westphal, who maintains that the owl overreacted. "From now on I'll keep my mouth shut. On the other hand, I'm hoping the nasty goo turns out to be a magical cure for the common cold, which is why my mouth was open in the first place."

Having counted during bitter winds in iced-over marshes and in weather so warm that glass lizards were active and mosquitoes feasted, I've come to expect the unexpected during CBCs. Non-bird surprises—ranging from interesting to unsettling—are frequent occurrences. A dead basking shark turned up on the beach during one Portsmouth count, and the only *Mola mola* I ever found washed up on a beach was during an Ocracoke count. But Bruce Sorrie, who participates in the Southern Pines count each year, had a story to top those. He recalled a Buzzards Bay, Mass., count in the early 1980s during which the group found a body floating in a canal. It turned out to be a suicide.

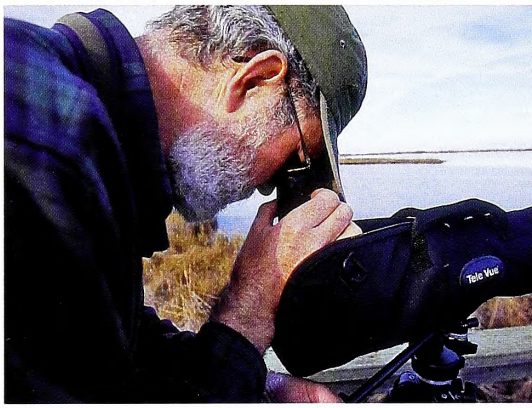
One criticism of bird counts is the fact that some participants tend to view them as competitions, going out of their way to turn up rare birds or surpass the number of species recorded in previous years—sometimes at the expense of accurately counting common species. In fact, the count's purpose is to record what's there—not to search for what isn't. Neither are the count circles evenly or randomly distributed. But the resulting data have repeatedly proven their worth, and with all their shortcomings, CBCs continue.

And they probably will continue, as long as there are people who believe in contributing to science while enjoying the company of good friends, and people who, quite simply, love birds. There's no point in searching too hard for me during late December and early January. Chances are I'll be out for the Count.

Jeff Beane is a herpetologist with the N.C. Museum of Natural Sciences.

If you'd like to participate in a CBC, or learn more about other bird-related citizen science projects, contact your local Audubon chapter, or visit the following Web sites:

audubon.org
carolinabirdclub.org
birdsource.org
birds.cornell.edu



SEMIPALMATED PLOVER
Charadrius semipalmatus

SHORT-BILLED DOWITCHER (LEFT)
Limnodromus griseus

WILLET
Catoptrophorus semipalmatus

F. EUGENE HESTER

The Golden Boys

JACK DERMID

FOR MORE THAN HALF A CENTURY, JACK DERMID AND GENE HESTER HAVE HIT THE ROAD IN SEARCH OF PHOTOGRAPHIC EXCELLENCE — AND MORE THAN A FEW GOOD TIMES.

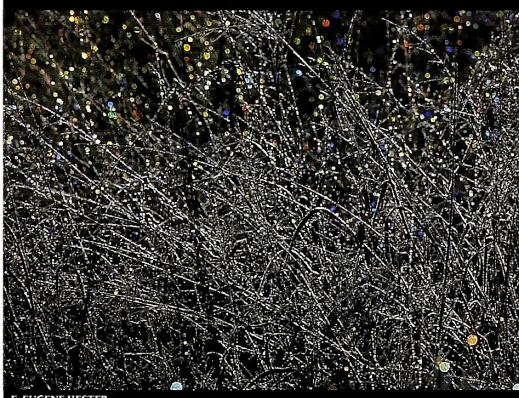
GARLAND PARDUE

It's a tough group that has gathered at a photo blind on a chilly, gray winter morning near Lake Wendell. Despite less-than-perfect lighting, Gene Hester, Jack Dermid and Garland Pardue have spent a couple of hours in a blind taking photographs of birds. Nothing out of the ordinary — some white-throated sparrows, Eastern towhees, cardinals. Just the species you might hear and see scratching about most any North Carolina greenbrier and honeysuckle thicket.

These fellows probably have taken hundreds of photographs of all three birds, but there is always that chance for a really great photo of a common species. Hester, Dermid and Pardue have traveled tens of thousands of miles together on photography trips to shoot far more exotic species.

Wood ducks and a love of photography first brought Jack Dermid (above left) and Gene Hester together in the outdoors in 1955.

written by Jim Wilson



F. EUGENE HESTER

JACK DERMID

JACK DERMID

NCWRC

JACK DERMID (4)

Dermid has a reputation for extraordinary patience in getting exactly the right shot.

Now noon is approaching, the day feels a bit damp and the three men—all retired biologists—have barbeque on their minds. They toss gibes at one another as only good friends of long standing can do. Dermid is talking about changing his shoes before lunch. "Jack's the only man I know who changes his shoes several times a day," Hester says. "He's like a woman about his shoes."

Dermid, oblivious to the teasing, says, "I just like to be comfortable. You're out in the field all day, your feet get cold and damp."

"Yeah, but you want to change 'em for *lunch*," Hester says.

Dermid, who is as wry as Hester is jocular, shakes his head and smiles. "I just want to be comfortable."

Minutes later, back across the highway beside the Lake Wendell boat houses, Pardue is talking about his days as an undergraduate and graduate student at N.C. State under Hester's tutelage. "Gene taught me everything I know," Pardue says, playing the straight man for Hester.

"You know, he's right," Hester says. "I did teach him everything he knows." Hester, a master raconteur, pauses for the punch line. "I just didn't teach him everything *I* know."

BUDDING CAREERS

Fifty-one years ago, Hester, then a 24-year-old with a master's degree from N.C. State in wildlife management (the program was then called wildlife conservation), made his first appearance in the pages of *Wildlife in North Carolina*. In a photo feature entitled, "Home of the Geese," he briefly recounted his time spent in the Canadian muskeg region of James Bay banding Canada geese.

The scenery in his photographs is flat, forbidding, bleak. Sporting a full beard and looking a bit weary, Hester, nevertheless, is smiling slightly. It has been a difficult three months. Home has been a couple of tents with a log windbreak. The nearest railroad is 35 miles distant; the nearest road fit for automobiles is 200 miles away.

"We actually had to get an explorer's permit from the Canadian government," Hester recalled. "They sent one of their employees, who was a full-blooded Cree Indian, with us. I guess they figured it was cheaper to have someone baby-sit us than to send somebody to find us."

Five years earlier, another young N.C. State graduate with a wildlife management degree had debuted in *WINC*. Jack Dermid's first byline story involved a fledgling blue jay that he had found on the ground beneath its nest. After returning the bird to its nest several times, only to find it lying on the ground again, Dermid decided to keep the bird. His story recounts the short life of "Saucy" the blue jay, who eventually was killed by a cat. Dermid's message was simple: It's always best to leave wild animals in their own environment.

A couple of years later, Dermid came to work for the N.C. Wildlife Resources Commission, where he eventually became *WINC*'s managing editor and also served as staff photographer without the title. Dermid's history with the commission might be the lengthiest on record. While he was a student at N.C. State, Dermid submitted pieces for publication in *North Carolina Wildlife Conservation*, the forerunner of *WINC* that published from 1937–1945.

"I had worked for the Wildlife Commission for several summers," Dermid recalled. "Then I went to Oregon State to work on a master's degree in wildlife management. I completed the course work, then came back to the commission and finished my thesis while I was working. I was just interested in photography; I wasn't trained in it. I learned as I went along.

"I was hired as an education representative. That encompassed whatever they wanted you to do. Clyde Patton [then the commission's executive director] might call at 4 in the afternoon and say, 'I'm supposed to give a talk to a wildlife club in Rocky Mount tonight, but I can't make it. I need you to take my place.' And off I'd go. I was a jack of all trades."

WOOD DUCK CONNECTION

It was photography—and wood ducks—that first brought Hester and Dermid together. Hester had become fascinated by wood ducks while taking an N.C. State ornithology class under Tom Quay. "When I learned that wood ducks nested in trees, that just set me on fire," Hester said. Soon Hester was making wood duck nesting boxes from whatever materials were handy—an old nail keg, trees blown down by Hurricane Hazel—and installing them at his father's pond near Wendell.

The timing of Hester's burgeoning interest in woodies was fortuitous. For more than a quarter of a century now, the wood duck has been one of the most popular species in North Carolina hunters' bags, usually ranking first or second each season. It is difficult for many hunters today to realize that early in the 20th century, biologists feared that wood ducks might become extinct. The season on them was closed from 1918, with the signing of the Migratory Bird Treaty Act, until 1941.

"One of the reasons wood ducks suffered so bad was there were no seasons," Hester said, switching from the role of storyteller to that of teacher, one at which he excels. "Most ducks migrated out of here by the first of March. Wood ducks were still around. They start nesting about the first of February. People were shooting wood ducks basically right off the nest. All ducks were suffering, but wood ducks suffered the most."

By the mid-1950s, wood ducks were well on their way back, but their population was nowhere near what biologists thought it could be. Dermid, who wrote his master's thesis on biological photography, learned of Hester's project and wanted to document it in photographs. The result was "Wood Duck Payoff" in the January 1956 issue of *WINC*.

"Jack was my mentor and helped me along the way, teaching me a lot of things about photography—biology, too," Hester said. "I was able to help him by telling where and when the birds would be nesting."

Hester, in fact, was one of the pioneers of wood duck research in the Southeast. That early work eventually led to the publication of a well-received book by Hester and Dermid in 1973, "The World of the Wood Duck."

"We've kept plugging away at it for half a century," Hester said of his outings with Dermid. Plugging away, however, does not fully describe the photographic journeys that Hester and Dermid undertake each year, along with Pardue. Usually it's three or four forays annually, with a few short outings on the side. Either as a threesome or as a pair, the men have photographed wildlife from Florida to New Mexico to Texas, Louisiana, South Dakota, Maryland and points in between. They have made more road trips—and delivered more one-liners, jokes and good-natured ribs—than Bing Crosby and Bob Hope ever considered in their "Road" movies.

"Jack will give us the photo tip of the day when we're on one of our trips," Pardue says.

Hester travels widely each year in search of waterfowl and deer.

F. EUGENE HESTER (2)

F. EUGENE HESTER

GARLAND PARDUE

GARLAND PARDUE

As a professor, Hester dressed the part, whether in his office or the field.

"Sometimes he'll give us a good one; other times it's the same one over and over," Hester adds. "Jack will say, 'Put film in your camera before you take pictures.'"

"How many tips can you have?" asks Dermid.

One story or laugh evokes memories of another, some from many years ago. "When I was at State, Gene always wore a white shirt and tie, even when he was in the field," Pardue says. "We were at Lake Mattamuskeet one time, the whole class out walking in the lake, and Gene has on a white shirt and tie under his waders. As we were coming back to shore, there was a big old cottonmouth moccasin in our way, and he was showing no signs of moving.

"There was a log floating nearby, so I figured I'd send that moccasin on his way. I raised the log over my shoulder to hit at him, and when I did it was so rotten that it broke and got mud and water all over Gene's white shirt. For some reason, Gene thought it was another guy in the class who had gotten him muddy. He'd bring that story up every now and then, fussing about that 'doggone Norris Jeffrey,' but it was years before I told him it was me who got mud all over his white shirt."

COMPLEMENTARY DIFFERENCES

One reason the partnership with Dermid has worked so well, Hester said, is that their personalities complement one another. "We have mutual interests, but we all bring something different to the table," he said. "Jack is much more the taxonomist, the patient guy who can wait all day to get the kind of picture he wants. He knows a lot about composition and a lot about the biology of the creatures, too, especially the birds and snakes and lizards.

"I'm probably more in the management thing. I want to build a pond or put up wood duck boxes or chop down some trees, plant something."

Dermid's patience in getting just the right photo and his sometimes offbeat subject matter is the stuff of legend among the trio. "One trip, Jack became fascinated with taking photographs of foam on the Sewanee [River]. He was getting what he calls peripherals," Pardue says.

"You finally photographed foam on the Sewanee, too," Dermid says. "You have to admit it had some really interesting designs."

On the drive back from Okefenokee National Wildlife Refuge one year, all three men succumbed to the lure of photographing a sign in Walterboro, S.C., that proclaimed: "We sell chicken feet."

"It was several years before any of us knew why anyone would want to buy chicken feet," Pardue said.

Dermid's attention to detail and his ability to create something extraordinary from an everyday scene were on display from 1950 to 1962 in *WINC*. He became interested in photography at a relatively early age. "I started taking wildlife pictures when I was in high school," he said. "The first camera I had was a folding Kodak, one that had a cocking lever for the shutter. It made it possible for me to cock the shutter, and tie a string to the release to get photographs.

"Some of my first wildlife pictures I remember taking were made with that camera by mounting it on a branch by a robin's nest and then moving maybe 50 feet away. When the robin would come to the nest, I'd pull the string and trip the shutter. The early cameras weren't automatic winding. If you had a nest 25 feet in the tree, you had to climb 25 feet every time you took a picture."

Dermid reprised those early efforts at photographing a robin on her nest in a freelance photo in *WINC* in 1949. The publication of the photos caused enough of a stir among readers that several months later Dermid was prompted to write a story, "Simplified Bird Photography," detailing exactly how he had obtained the shots.

ROAD TO WASHINGTON

After obtaining his master's at N.C. State, Hester, believing he needed to beef up his understanding of fisheries management, headed to Auburn University for a doctorate in fisheries. "In my naiveté, I thought I would become a fisheries and wildlife biologist," he said. "You just don't do that—you are one or the other."

Hester taught at Auburn for a year after finishing his doctorate, and then returned to N.C. State as an assistant zoology professor. Four years later, in 1963, he became the first head of the university's Cooperative Fishery Unit, which was administered at the time by the U.S. Fish and Wildlife Service. In 1971, Hester headed to Washington, D.C., where he eventually became the deputy director of Fish and Wildlife and served a lengthy spell as acting director. He ended his career as deputy director of the National Biological Survey.

But Hester and Dermid, who left the commission in 1962 to teach biology at UNC-Wilmington, remained friends. Hester also kept his hand in at *WINC*, providing photographs and later stories about fishing and hunting. Although Hester basically ran a federal agency of more than 6,000 employees and adapted readily to dealing with high-powered political appointees, in many ways —the best ways—he remains the fellow from Wendell who loved to hunt and fish as a child. He's still the guy who was overjoyed to find that he could earn his college degree by studying wildlife.

GARLAND PARDUE

Dermid often finds interesting subjects in ordinary places.

MELISSA McGAW

Garland Pardue (middle) is now part of Dermid's and Hester's travels.

"When I saw that I could actually major in wildlife conservation and management, I thought I had died and gone to heaven," Hester said. "Better yet, I thought I was still living and had gone to heaven."

At age 75, Hester has a young person's excitement about learning and the natural world. He is a man fascinated by numerous things, and that shows in his photographs, many of which have not only graced this magazine, but many others, too. These days, it's a rare issue of *WINC* that does not include the photo credit "F. Eugene Hester."

His enthusiasm is infectious, whether with friends or students or someone he's just met. And Hester possesses the rare ability to become genuinely interested in what you are doing, what you're thinking.

"He was a very hands-on teacher," said Pardue, who studied under Hester both as an undergraduate and graduate student. "His students thought a lot of him. He was the same then as he is now with young people. That's his life. He's never lost that interaction with people."

Like Hester, Pardue received his undergraduate and master's degrees from N.C. State, followed by a doctorate in fisheries from Auburn. Since retiring as supervisor of Fish and Wildlife's Ecological Services Field Office in Raleigh, Pardue has often hit the road with Hester and Dermid.

"Jack's sole focus is pretty much on photography. That's what he does with almost all of his free time," Pardue said. "Gene pretty much divides his time between photography and fishing. He's either going to be doing one or the other, or sometimes both, all day. I love doing both, and I love doing it with them. If they stopped doing either or both, I'd probably stop, too."

LUCKY DAY

One of the annual trips the trio makes is to Cades Cove to photograph deer. "One year, Gene and I would get up early and go to the park," Pardue said. "We'd be at the gate waiting for them to open up so we could get some shots of the deer before they moved off into the woods. Jack, as he's gotten older [he's now 83], is less interested in getting up at the crack of dawn. He'd come in about 9 o'clock. Gene and I had been there since 6.

"Gene and I would be walking through wet grass trying to photograph a deer. We were really trying to photograph deer jumping fences, jumping logs or deer fighting—something more unusual than a deer standing out in the woods. We were not having much luck this one day, and we hooked up with Jack at lunchtime. He was sitting on the tailgate of the truck. We told him a little about what we had been photographing, but that we hadn't gotten exactly what we wanted. We asked Jack how he'd done.

"'Well, I didn't get much. I got three or four pictures of deer fighting, a deer jumping a log.'"

"In a couple of hours, Jack had gotten the things we'd been trying to photograph all morning."

"Jack reminds me of the fellow who's playing poker and says, 'All I've got is two pair of aces,'" Hester said.

Dermid's assessment is simple: "That was a lucky day."

A partnership that began in the 1950s has aged gracefully, as have the partners. Dermid has had some health problems that have slowed him a bit. "Gene and I went out to Lake Wendell this morning, and he had to help me get in the boat," Dermid said recently. "Normally I'd hop right in like a grasshopper. I'm not as steady as I used to be."

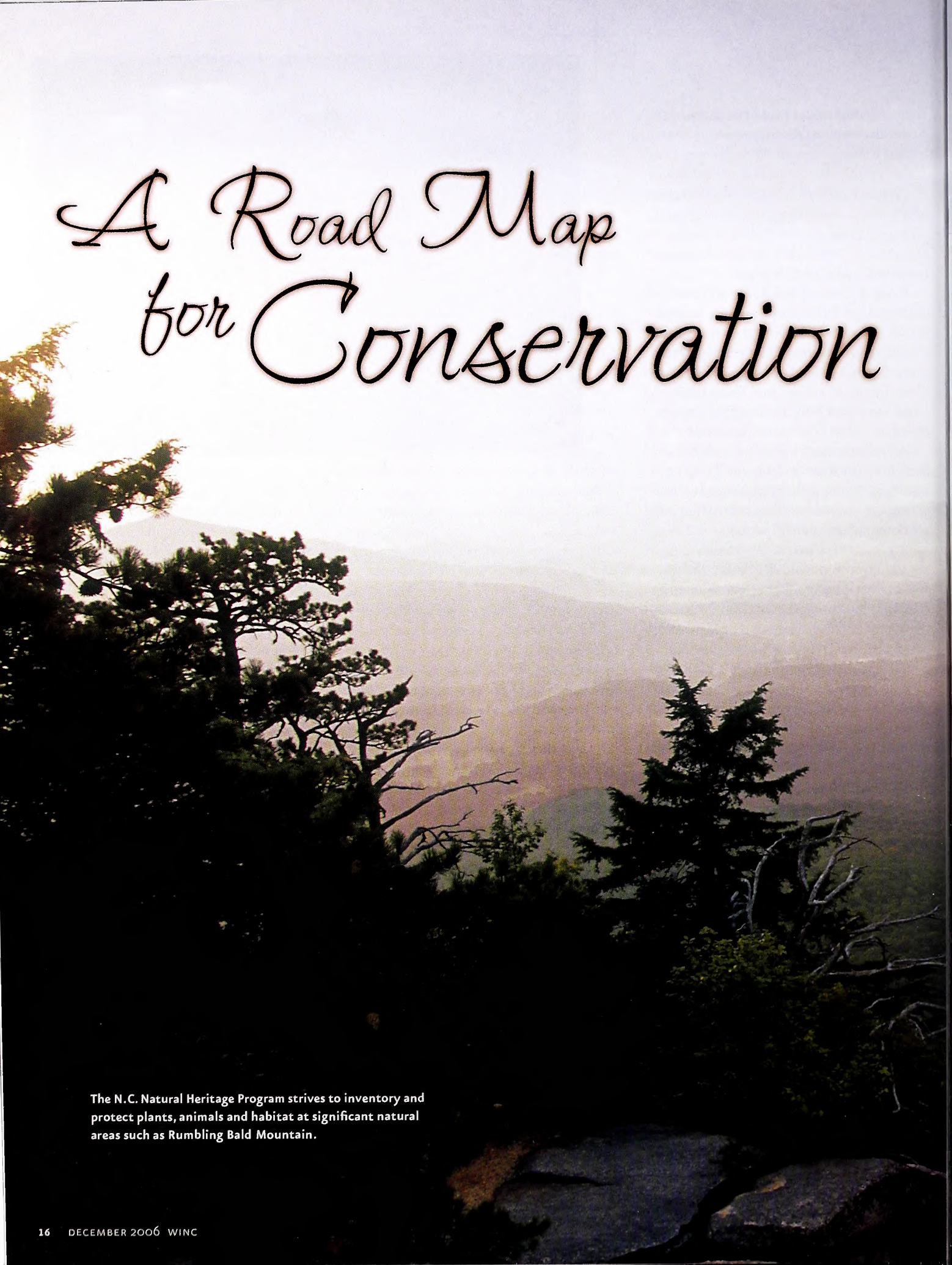
The important thing is that Dermid is still out there, still adding beautiful photographs to an illustrious body of work. And there are trips yet to be made, places both old and new to see. Cades Cove is an annual December adventure, and Hester is set to return to South Dakota in late winter to catch the earliest waterfowl heading north to their breeding grounds. He has yet to convince Dermid to make that trip, but he's still working on his partner, trying, in a gentle, ribbing way, "to see if he's man enough to go stand on the ice."

Whether he goes or not, Dermid's decision will become part of the arsenal of stories that bind them. "There's an old saying that in a great partnership, each guy thinks he got the better part of the deal," Hester says. "I know I got the better part of the deal with Jack." ◆

"There's an old saying that in a great partnership, each guy thinks he got the better part of the deal," Hester says. "I know I got the better part of the deal with Jack."

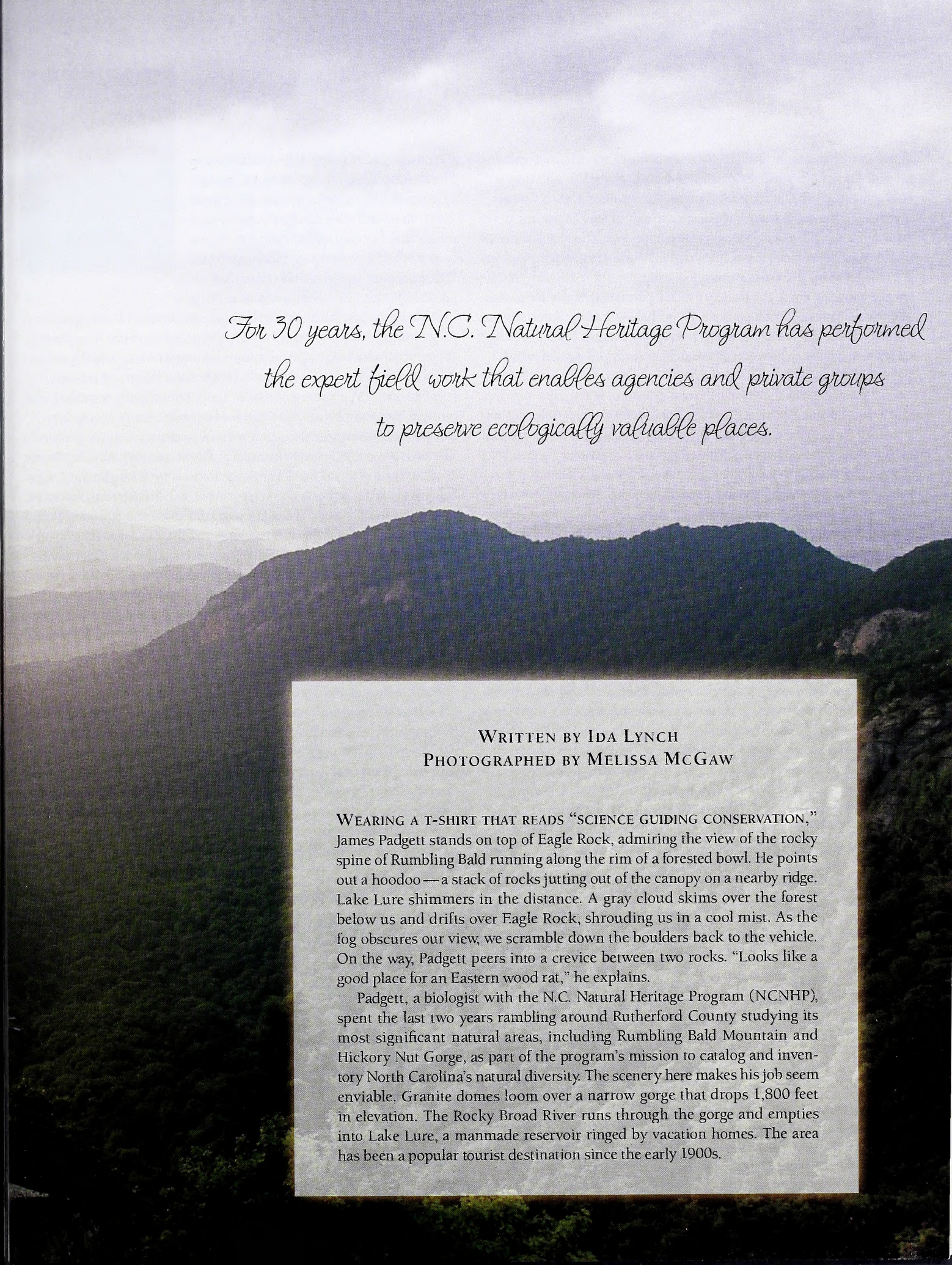
Jim Wilson is associate editor of Wildlife in North Carolina *magazine.*

A Road Map for Conservation



The N.C. Natural Heritage Program strives to inventory and protect plants, animals and habitat at significant natural areas such as Rumbling Bald Mountain.

For 30 years, the N.C. Natural Heritage Program has performed the expert field work that enables agencies and private groups to preserve ecologically valuable places.



WRITTEN BY IDA LYNCH
PHOTOGRAPHED BY MELISSA MCGAW

WEARING A T-SHIRT THAT READS "SCIENCE GUIDING CONSERVATION," James Padgett stands on top of Eagle Rock, admiring the view of the rocky spine of Rumbling Bald running along the rim of a forested bowl. He points out a hoodoo—a stack of rocks jutting out of the canopy on a nearby ridge. Lake Lure shimmers in the distance. A gray cloud skims over the forest below us and drifts over Eagle Rock, shrouding us in a cool mist. As the fog obscures our view, we scramble down the boulders back to the vehicle. On the way, Padgett peers into a crevice between two rocks. "Looks like a good place for an Eastern wood rat," he explains.

Padgett, a biologist with the N.C. Natural Heritage Program (NCNHP), spent the last two years rambling around Rutherford County studying its most significant natural areas, including Rumbling Bald Mountain and Hickory Nut Gorge, as part of the program's mission to catalog and inventory North Carolina's natural diversity. The scenery here makes his job seem enviable. Granite domes loom over a narrow gorge that drops 1,800 feet in elevation. The Rocky Broad River runs through the gorge and empties into Lake Lure, a manmade reservoir ringed by vacation homes. The area has been a popular tourist destination since the early 1900s.

Padgett shares tidbits of local lore with me as we drive around, but his true focus is less human-oriented: He's looking for wild things. Hickory Nut Gorge is a significant part of the Rutherford County inventory. This site is home to 13 rare animal species, including peregrine falcons, and 34 rare plant species, including white irisette. Later that day, as we hike at privately owned Chimney Rock Park, Padgett is in his element. He darts from one plant to another, identifying the species growing along the trail and talking about each plant's life history. He seems to use all his senses as he studies the vegetation. At one point, as he pauses to sniff a plant to help distinguish it from another species, he grins and says, "Botanists need a good sense of smell."

Thirty years in the field

Since the Natural Heritage Program was established in 1976, biologists like Padgett have spent countless days throughout the seasons hiking, crawling and wading through the state's most important wild places. The program "inventories, catalogues and supports conservation of the rarest and most outstanding elements of the natural diversity of our state," according to its Web site. "These elements of natural diversity include those plants and animals which are so rare or the natural communities which are so significant that they merit special consideration as land-use decisions are made."

Program biologists log thousands of miles every year as they drive all around the state to collect their data the old-fashioned way — in the field. They brave conditions that keep many people indoors: inclement weather, humidity, chiggers, ticks and snakes. They slog through impenetrable places searching for new territory: waterlogged bottomland swamps, dense rhododendron thickets (called "rhodo hells") and dimly lit, briar-tangled pocosins.

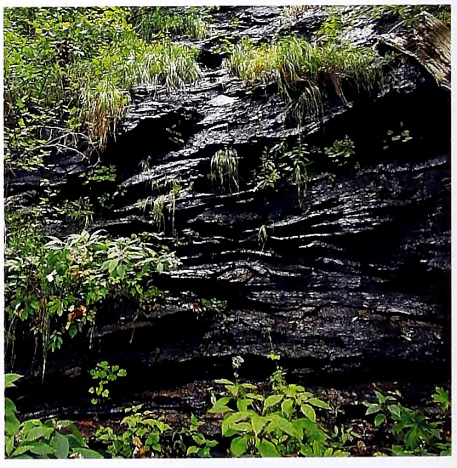
"We're trying to understand and document what makes North Carolina such an ecologically special place," explains Linda Pearsall, the director of the program, which is housed within the N.C. Department of Environment and Natural Resources. This is an ambitious mission, in light of North Carolina's great ecological diversity: The state ranks ninth in the country for its total number of plant and animal species, not including invertebrates, and is ranked 11th in the number of rare species, according to *Precious Heritage*, a joint Nature Conservancy and NatureServe publication from 2000. The Natural Heritage Program estimates that North Carolina is home to at least 5,700 native plant species, more than 700 vertebrate species and more than 10,000 species of invertebrates.

The program's findings are methodically entered into a database that contains information about 25,000 occurrences of rare plants, rare animals and high-quality natural communities. "The Heritage Program shares this data with the public for a variety of reasons," says Pearsall. "We strive to serve as a repository for rare species and natural community information for the state, simplifying data-sharing between agencies, organizations, industry and the public." The data helps guide land management and conservation decisions all across the state. "The Heritage database is very significant," says Alan Weakley, a botanist and curator of the UNC Herbarium who worked at the Natural Heritage Program from 1984 to 1994. "You can use the database to research how rare species have fared over multiple decades, and it's very useful to researchers when they're trying to locate rare populations. Environmental consultants use the database extensively to avoid unnecessary impacts to biological resources." The many public agencies that utilize Natural Heritage data include the N. C. Department of Transportation, the Department of Defense and local governments.

Urgent mission

The NCNHP mission becomes more urgent every day. With North Carolina's population projected to increase from 8 million to 12 million people by the year 2030, conservationists are working feverishly to identify and protect North Carolina's most important wild places and green spaces before they are developed.

One of the program's ongoing initiatives is to inventory the significant natural areas in every county. To date they have inventoried 76 of the state's 100 counties and will complete eight more in the



Botanist James Padgett uses a GPS unit to mark the location of an uncommon Appalachian Joe-pye-weed. The rare Biltmore sedge grows along rocky slopes in the mountains.

next several years. Inventorying a county's natural areas is like a "grand detective game," according to botanist Bruce Sorrie, who is based in the Sandhills. "Our first step is to gather all the available information from the Heritage Program database, such as information about all the rare species documented from that county," he explains. "We also contact the [N.C.] Wildlife Resources Commission and the N.C. Museum of Natural Sciences for records that are not yet in our database. And we talk to people in the field such as foresters, naturalists and state biologists who are very knowledgeable about their landscape."

In planning their ecological expeditions, the biologists also pore over documents for clues. "We study aerial photos and look for large chunks of intact forests, wetlands, and basically drawing circles on maps around places we want to explore," says Sorrie. Since many of the potentially significant sites are privately owned, the staff also acquires tax records, often with the help of local land trusts, and contacts landowners to request permission before visiting their property.

When the biologists visit a natural area, they conduct a sort of "rapid ecological assessment" and identify as many rare community types and species as they can in their limited time frame. The site's potential as a protected conservation site must stay in the top of their minds. "When you're inventorying a site, you look for the biological elements and high quality natural communities and also the conservation possibilities of the land," says Weakley. "One of the hallmarks of the Heritage network as a whole is that the biologists are not only looking for plants and animals, they are also looking for conservation elements and thinking about whether a site is viable as a potential conservation area."

Although the biologists investigate both public and private lands in the inventories, they tend to focus on privately owned tracts that are not under any kind of conservation protection. The Heritage Program shares the inventories with county officials to help inform their planning efforts. "Orange County uses Natural Heritage Program data to prioritize sites for land conservation through its Lands Legacy Program," says Rich Shaw, land conservation manager with Orange County's Environmental and Resource Department. "Since the program was established in 2000, the county has protected 800 acres through direct purchase (for parks and nature preserves) and another 865 acres with conservation easements on privately owned lands."

The smaller things

Natural Heritage biologists also keep an eye on habitats and creatures in the state that are sometimes overlooked, including invertebrates. "Aquatic ecosystems continue to be the most threatened of North Carolina's natural systems," says Pearsall. "Nearly 30 percent of our native species of fish, mussels and crayfish are threatened with extinction. We know this because staff of the N.C. Wildlife Resources Commission has been collecting extensive data on our aquatic species."

To take advantage of this data, NCNHP has started a freshwater conservation initiative. "We're jointly funding the Heritage Program staff time to assist with aquatic ecosystem protection," says Scott Van Horn, supervisor of the Wildlife Commission's aquatic nongame biologists. "This is a new effort, and we hope to help property owners that have important aquatic species on their land or within their jurisdiction develop strategies to provide conservation and identify sources for funding assistance. We also collaborate on a variety of aquatic species conservation activities like public outreach and commenting on the impact of development projects."

"The greatest threats to freshwater ecosystems comes from changing land use patterns," explains Sarah McRae, freshwater ecologist with NCNHP. "We should all be concerned about our lakes, streams and rivers, because they are the sources of our drinking water, and provide us with recreation, food sources and great habitat for birds and mammals, as well as fish, crayfish and freshwater mussels."

North Carolina's numerous regional land trusts also serve as vital partners for the Natural Heritage Program's aquatic biologists. "We are working with various local land trusts, such as the Tar River Conservancy and the Triangle Land Conservancy, to help them set conservation priorities that are aquatic-focused," says McRae.

Fort Bragg has the world's largest population of the rare Sandhills lily. Botanist Bruce Sorrie checks a federally endangered Michaux's sumac plant.

Back on dry land, Steve Hall, the program's invertebrate zoologist, is one of the few scientists in the state who focuses much of his energy on thinking about how to conserve terrestrial invertebrates such as Lepidoptera (moths and butterflies). A Heritage program staffer for 16 years, some of Hall's early projects involved studying insects in The Nature Conservancy's longleaf savanna preserves in the Coastal Plain to "provide management recommendations regarding prescribed burning," he explains. "The Lepidoptera are one of the most diverse groups of insects and animals in general and include a lot of habitat specialists, such as the Venus flytrap moth, which feeds primarily on the leaves of Venus flytraps, itself highly restricted to longleaf savanna habitats."

Although much of Hall's work is devoted to understanding a particular part of complex ecosystems, he employs a larger conservation vision. "I'm not so much focused on looking for new species, although we are constantly discovering new species to the state and have even found species new to science," he says. "What's more important for conservation purposes is to understand the ecological relationships of these insects to certain habitat types." For instance, Hall discovered that the St. Francis' satyr, a butterfly that is only found in one population at Fort Bragg and is the state's only federally endangered insect, is not only closely associated with abandoned beaver ponds, but may be limited to just the peculiar types of these habitats found at Fort Bragg.

> **"As universities have tended to go away from organismal and field biology, some of the best field biologists are now in the natural heritage programs."**
>
> **–Alan Weakley**

The fate of insects such as this butterfly is interconnected to many other forms of life. "Insects are the base of the food webs," Hall says. "They provide food for the vertebrates, such as birds, bats, lizards, frogs, fish and other animals that are higher on the food chain. They also play many other key ecological roles, such as pollinating many plants. Ecosystem conservation needs to take insects into consideration to be successful, and conversely, protecting ecosystems probably provides a more effective way of preserving rare insects than efforts directed solely at individual species."

Experts in the field

Spend a day in the field with one of the Heritage Program's crackerjack biologists, and you begin to appreciate the fervor and talent of these ecological sleuths. Many of the scientists began their foray into "naturalizing" because of an interest in a particular outdoor hobby, such as birding or studying plants. But over time, most of them branch out into other disciplines, so that today, they comprise walking encyclopedias of knowledge about North Carolina's natural diversity. In other words, despite their titles, the staff zoologists know their plants, and the staff botanists know their birds. A talented all-around field naturalist is a rare commodity. "As universities have tended to go away from organismal and field biology, some of the best field biologists are now in the natural heritage programs, " says Weakley. "The nature of the Heritage Program's work promotes becoming well rounded because inventories are done by one or two who have to be skilled at appraising natural diversity and assessing the conservation practicality of the site," says Weakley.

Although many of the biologists' field forays are carefully planned, some of their greatest discoveries have happened almost by accident. While conducting a boat survey along Frenchs Creek in Camp Lejeune Marine Corps Base one October, Natural Heritage botanist Richard LeBlond spotted a large goldenrod growing on the shoreline. "I couldn't figure out what it was," recalls LeBlond. "Most really interesting plant discoveries begin with 'What the heck is this?' and frustration." In 2000, after LeBlond and other botanists did a thorough investigation, the species was officially described as one new to

NCWRC

Aquatic biologist Sarah McRae uses an underwater viewing scope to search for mussels such as this undescribed species of *Lampsilis*.

science. Six years later, Coastal goldenrod *(Solidago villosicarpa)* is still found in only five locations in the world.

In 1991, while participating in a biological survey of Fort Bragg conducted on behalf of NCNHP and The Nature Conservancy, Sorrie located a population of a brilliant orange lily that had first been collected in the 1970s. After comparing it to other specimens and enlisting the help of a botanist who received his doctorate in studying lilies, Sorrie determined that it was a species new to science. The population at Bragg turned out to be the largest population in the world. The plant was named *Lilium pyrophilum*— fire-loving lily — because it requires frequent fires to knock back competing shrubs.

Finding special places

Fortunately, Natural Heritage discoveries often result in the protection of significant natural areas by conservation agencies. Old Dock Savanna was discovered when Weakley and Community Ecologist Michael Schafale were searching for a Coastal Plain lake that showed up on state maps, but had not been seen by NCNHP. Instead of a lake, they found one of the richest rare plant sites in the state. When the landowner was notified of its ecological significance, she began talking with The Nature Conservancy. Within two years, the site became a nature preserve.

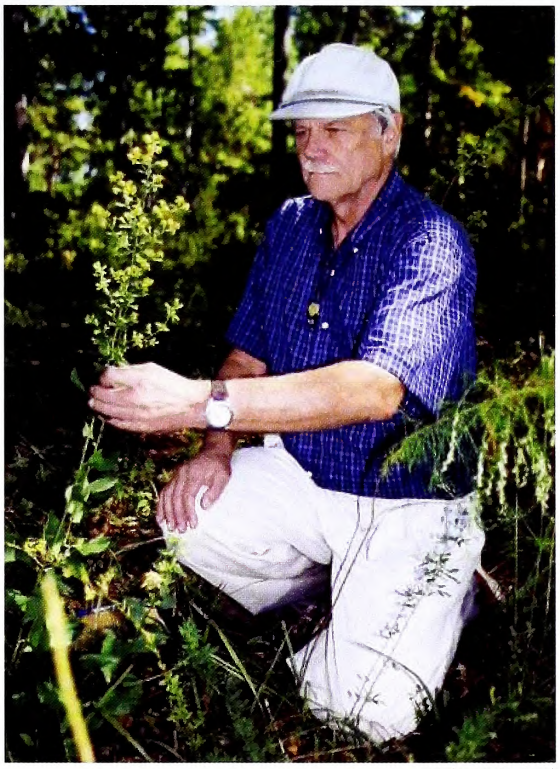
"The Heritage Program's work has guided The Nature Conservancy's conservation work in North Carolina from the very beginning," says Merrill Lynch, assistant director for protection for The Nature Conservancy's North Carolina chapter. "They have essentially created a conservation road map from their countywide inventories and biological surveys that help us make conservation decisions." And this data often provides invaluable information for conservation groups' fundraising efforts.

"Having the Heritage data in hand when we are seeking grant funding is critical," says Janice Allen, director of land protection for the N.C. Coastal Land Trust. "So many of the funding sources, such as Clean Water Management Trust Fund and Natural Heritage Trust Fund, request that we provide extensive information about the natural heritage values of a potential conservation site."

Just a few examples show the connection between the Heritage Program and conservation stories. The discovery of rare plants such as a federally endangered mountain bluet on the rocky outcrops of Three Top Mountain in Ashe County sparked a Nature Conservancy/Wildlife Commission conservation initiative that ultimately resulted in the creation of the 2,808-acre Three Top Mountain Game Land. The natural wonderland of the Joccassee Gorges in Transylvania County had long fascinated naturalists, but when Natural Heritage botanists discovered a medley of unusual plants there, including ones more commonly found in the wet tropics, the findings helped conservation groups build momentum to organize a land acquisition campaign that protected Gorges State Park and Toxaway Game Land.

For more information, visit the N.C. Natural Heritage Program on the Web at ncnhp.org.

NORTH CAROLINA Natural Heritage Program
SCIENCE GUIDING CONSERVATION



PATTY MATTESON, USFWS

Botanist Richard LeBlond checks the health of Coastal goldenrod, a species he discovered and described.

"There are examples all over North Carolina of the Natural Heritage Program identifying a site and bringing it to everyone's attention, which ultimately results in conservation," says Lynch. "You might start with one discrete site, but often these projects expand when you start thinking about the big picture and how to achieve long-term conservation through connectivity and corridors. If a place is too isolated over time and animals and plants can't interact with other animals and plants, then you have this sort of slow extinction process. We have a good network of conservation lands in North Carolina and now we're trying to connect them. The Heritage Program is helping us with conservation planning by helping us figure out how to connect the dots."

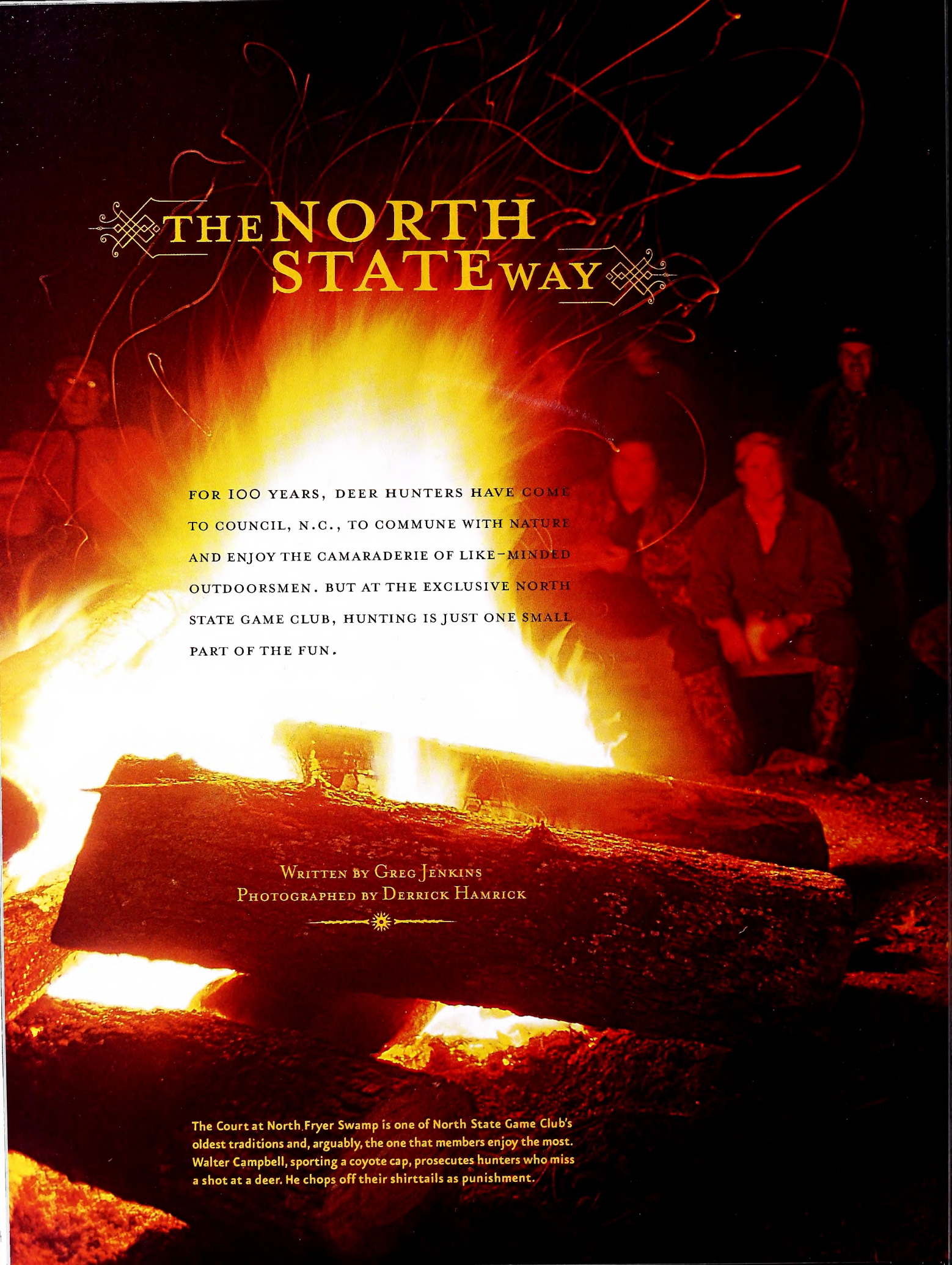
Pearsall hopes that her team of eco-experts is creating a knowledge base for all North Carolinians. "Everyone knows that the state is home to longleaf pine forests, but we also want people to understand that the wiregrass, orchids, pitcher plants, birds and insects that live in longleaf forests comprise a more diverse ecosystem than some of the tropical rainforests," she says, "and that there are equally important natural areas in the Mountains and the Piedmont. We hope that everyone will use the Heritage information to gain a better appreciation and understanding of what makes North Carolina such a rich and wonderful place to live." ◆

Ida Lynch is co-owner of Niche Publishing and a frequent contributor to Wildlife in North Carolina.

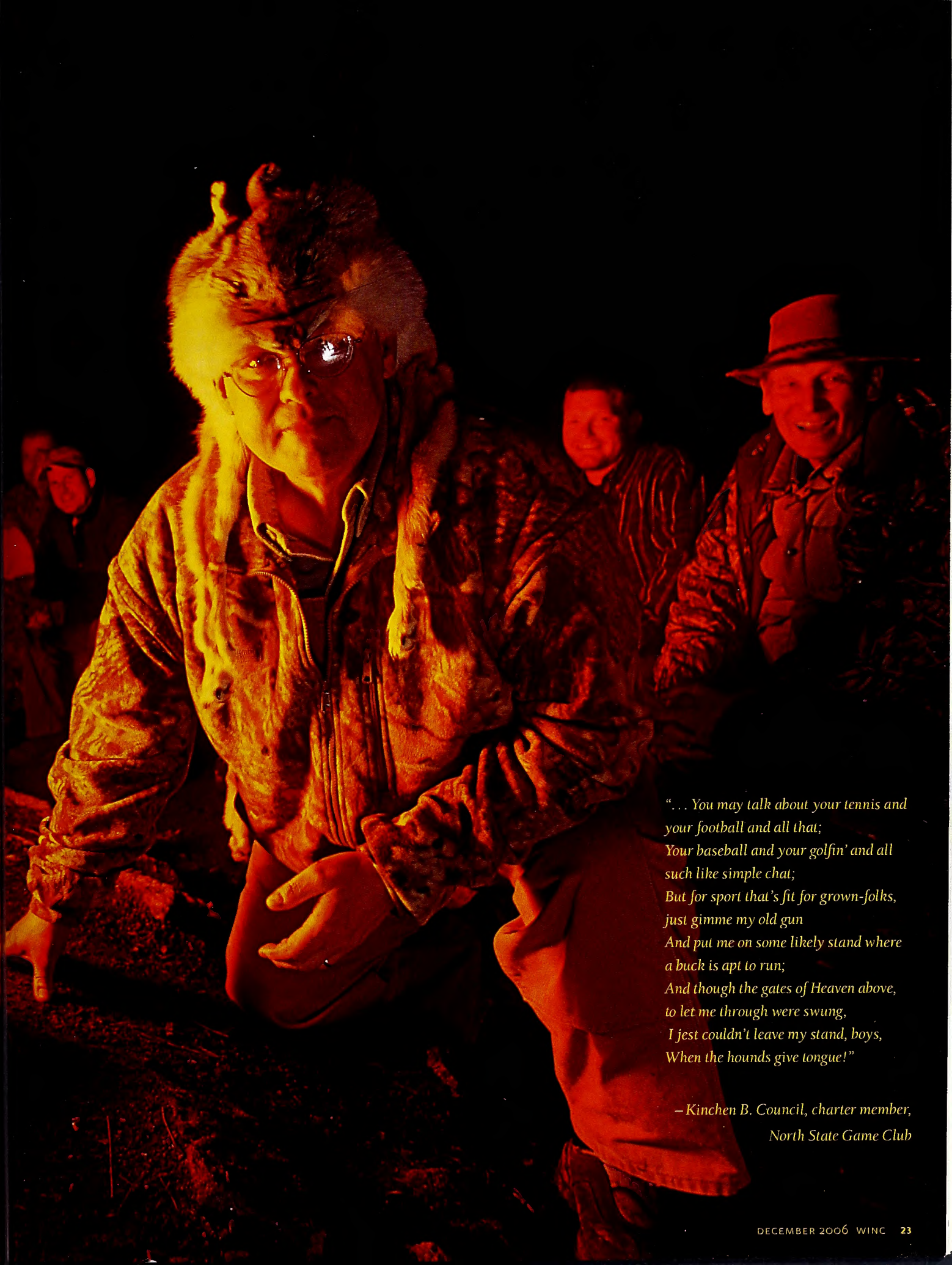
THE NORTH STATE WAY

FOR 100 YEARS, DEER HUNTERS HAVE COME TO COUNCIL, N.C., TO COMMUNE WITH NATURE AND ENJOY THE CAMARADERIE OF LIKE-MINDED OUTDOORSMEN. BUT AT THE EXCLUSIVE NORTH STATE GAME CLUB, HUNTING IS JUST ONE SMALL PART OF THE FUN.

WRITTEN BY GREG JENKINS
PHOTOGRAPHED BY DERRICK HAMRICK



The Court at North Fryer Swamp is one of North State Game Club's oldest traditions and, arguably, the one that members enjoy the most. Walter Campbell, sporting a coyote cap, prosecutes hunters who miss a shot at a deer. He chops off their shirttails as punishment.



"... You may talk about your tennis and
your football and all that;
Your baseball and your golfin' and all
such like simple chat;
But for sport that's fit for grown-folks,
just gimme my old gun
And put me on some likely stand where
a buck is apt to run;
And though the gates of Heaven above,
to let me through were swung,
I jest couldn't leave my stand, boys,
When the hounds give tongue!"

– Kinchen B. Council, charter member,
North State Game Club

Hunt leaders prepare to release the hounds at the beginning of a hunt. Once the dogs are free, the chase is on and hunters listen intently, hoping the hounds will drive a deer past their stand.

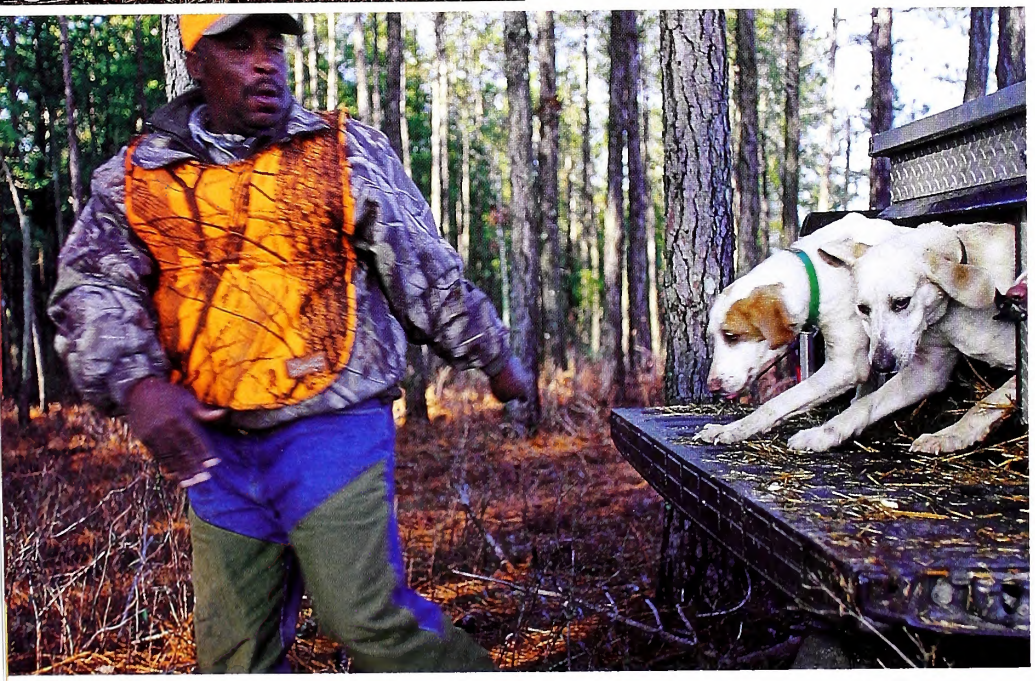
In the pine woods of southern Bladen County, no more than 40 miles from the city lights of Wilmington, a place exists that seems untouched by the last six or eight decades. Save for the occasional tip of the hat to modern convenience—electric refrigeration, brand-new pickup trucks, autoloading shotguns—the stories told there and the activities that inspire them are virtually the same as the ones legendary outdoor writer Robert Ruark wrote about in 1946. And if you read Ruark's story "Dixie Deer Hunt" from the Oct. 26 issue of *The Saturday Evening Post* that year, you would need to change only a few minor details for it to remain accurate today.

That's the way the 55 members of the North State Game Club like it. They prefer that a weekend deer hunt there be much like it was 100 years ago, when founder John Pickett Council and a handful of friends founded the club. At North State, that means individuals waiting alone at their deer stands while a huntmaster follows a pack of hounds through the forest in an attempt to drive deer past as many stands as possible.

North State Game Club differs most significantly from other Southern hunt clubs in its members' expectations for the weekend, and their collective definition of a successful hunt. If the running of dogs through the club's property results in a few members each getting a shot at a deer and one person reducing a whitetail to possession, the day has been a rousing success. Although, if no one misses a shot on the traditional Friday hunt, the day might be considered a failure because of how it affects Friday night.

Since the days of its founders, North State has held a kangaroo court around a bonfire to judge and punish those accused of missing a shot. By all accounts, the Court of North Fryer Swamp has a 100 percent conviction rate over the last century. As if to prove it, the dining hall is decorated with dozens of shirttails cut off the garments of guilty hunters.

Time alone in the woods, the sound of the hounds working, a few good meals, sleeping outside for a couple of cool nights, time spent in fellowship with good friends who share these same passions—those are the expectations a hunter brings to North State on autumn weekends. They are the same expectations Council and his cronies brought 100 years ago. "North State is a way of life for some people," said Dial Gray, a descendant of John Pickett Council and a fourth-generation member for more than 30 years. "It has the best fraternity and brotherhood. It's a good influence on young men."



ROUGHING IT . . . TO A POINT

A hunt weekend at North State walks a fine line between camping and cushy. The club's main building consists of a dining hall capable of seating 85, plus an adjacent parlor known as the John Pickett Council Room. A few steps away are two sleeping cabins dubbed the Mayflower and the Hilton. Each building sleeps about 25 and is outfitted with bunk beds, electricity and plumbing, but no climate control. A large wood-burning fireplace in each building provides the necessary heat on chilly nights, as well as a glow that illuminates late-night conversations about sports, politics, religion, current events and, of course, the day's hunt.

Hunters arrive on Thursday evenings to a fine dinner spread of favorites such as fried chicken, collards, rice, green beans, biscuits and cornbread. Cooks prepare three meals on Friday, when there are usually morning

and afternoon hunts, as well as breakfast and lunch on Saturday, when hunters leave following a final morning hunt. Grilled venison is the specialty of the house, cooked over coals in the dining hall fireplace just as it was when Ruark visited 60 years ago — and before then as well.

While some hunters retire to the cabins, other hardy souls and more junior members sleep in the Bullpen, a large shed open to a bonfire that is kept stoked all night. The Bullpen's accommodations include a thick layer of pine straw on which to throw a sleeping bag. The opposite side of the structure is known as the Heifer Pen, where female guests sleep during ladies' hunts.

On hunt mornings, after consuming a hearty breakfast, a bell is rung and everyone convenes in front of the main building for the "circle up." This club tradition includes a welcome, introduction of guests and prospective members, counting off of participants and the rules of the hunt. Afterwards, hunters drive down sandy roads named after former and current club members to hunting stands also named after former and current club members. Once on the stand, the waiting begins.

For those who truly want to hunt, the sound of approaching hounds is the sweetest music imaginable. Kinchen B. Council, a charter member and brother of J.P. Council, wrote "When the Hounds Give Tongue," an ode to the canine symphony, sometime in the early 1900s. Poetry is a grand tradition at North State, much of it written while sitting in a stand, waiting for the hounds to bawl or simply admiring the gorgeous day (see "The hunt that inspires poetry," page 27). Hunters inspired in a different way are often found napping on their stand. Judge Sandy McKinnon, who has been a club member since 1947, longer than anyone else, actually went almost 30 years without taking a shot. McKinnon missed a buck in 1936 when he was 14 years old, and despite hunting every year except for a couple during World War II, he did not fire his weapon again until 1965, when he finally killed a North State buck. To celebrate, the club named a stand after him.

THE EVER-PRESENT PATRIARCH

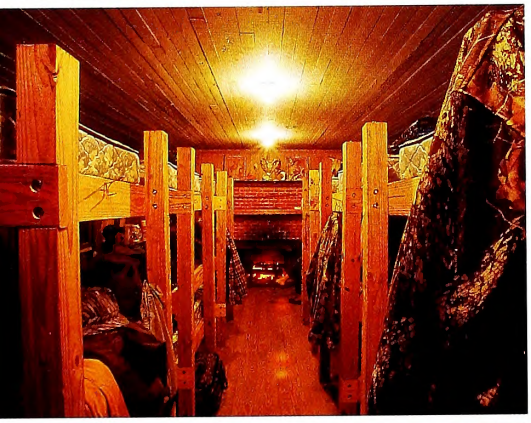
John Pickett Council (1855–1929) had a knack for creating enduring institutions. The Bladen businessman and farmer founded the Council Tool Company in 1886 to make tools for turpentine harvesting, an industry that was huge in southeastern North Carolina at the time. His company has stayed in business for 120 years by continuing to manufacture top-quality tools used by building contractors and firefighters.

During the 1880s, Council and several friends maintained a loosely organized hunt club on his land, some of which still belongs to North State. After Council moved the tool company just across the Bladen-Columbus county line to Lake Waccamaw in 1902, the group began to talk about formalizing their hunting arrangements. The men mapped off a large chunk of Council's property and chartered the North State Game Club Company on Aug. 29, 1906. Council owned tens of thousands of acres, much of which was used by the club at various times. Now the club owns and leases a bit more than 6,000 acres, some of which is timbered and some of which is far too swampy to even consider such a proposition.

Most of the original membership came from communities along the Seaboard Railroad. There were three hunts a year — October, Thanksgiving and after Christmas — so hunters would take the train to Council Station and stay for a week. Originally, membership

From top left: The Bullpen provides a place for club members to sleep outside by the campfire. The ceiling of North State's dining hall is decorated with shirttails removed from hunters found guilty at the Court of North Fryer. Deer trophies and photos from years and years of hunts at the club adorn the walls of the dining hall. Alex Gregg, the club's oldest member, is the grandson-in-law of founder John Pickett Council.

Right: The ringing of a bell calls hunters to assemble in front of the clubhouse for the "circle up" that precedes a hunt. Below: Nights are often spent chatting in front of the fire in one of North State's two cabins, which are outfitted with bunk beds. Club caretaker and huntmaster Cicero McLean also serves as the greeter.



was strictly limited to 25 people. It remained that way until the early 1950s, when it was increased to 40 and eventually to its current 55. There are about 10 honorary members, most of whom who are retired from hunting and pay no dues but are welcome back anytime. And despite the presence of 11 on a waiting list, the club has no plans to increase membership. Sons, sons-in-law and brothers of members have always had preference and automatically move to the top of the waiting list. As a result, more than half of the members are at least second-generation, and a few are fourth-generation North Staters.

As one might imagine, North State's membership has always included movers and shakers. Clyde Council, J. P. Council's son, was a state senator, president of Council Tool Co., a banker and a trustee of the University of North Carolina system. He was also the huntmaster, riding a horse around the club's land to check on hunters, until his death in 1951. John Umstead (whose brother, William, was governor from 1953 to 1955) was an executive at Jefferson Standard Life Insurance, a 14-term member of the General Assembly, a UNC system trustee and the man who arranged the purchase of Camp Butner from the federal government after World War II for use as a mental hospital.

Even farther back, North Carolina governor Cameron Morrison (served 1921–25) was a North State member. John D. Chalk, North Carolina's first commissioner of game, also was on the club membership roll. His grandsons, John III and Bryan

Chalk, both currently belong to the club. John III and fellow club member Perry Harris have each served on the board of the National Wild Turkey Federation. Current member Bob Gordon was chairman of the N.C. Wildlife Resources Commission for eight years and is now chair of the N.C. Natural Heritage Trust Fund.

Especially long-tenured current members include Alex Gregg, the club's oldest member at 86 and the son-in-law of Clyde Council. Gregg joined the same year his father-in-law died, 1951. D. E. Ward Jr., a member since 1953, is one of several physicians in the club—albeit the only one still performing surgeries at age 83.

Regardless of their stature in the real world, all members are equal at North State. For decades, there was a mailbox on the dirt road that leads to the club. All members were expected to place their egos, honors, awards and titles in the box on the way in, and pick them up on the way out. "The people who started the club had great character and strength," said club president Ben Wilson, a 15-year member.

ORATOR, PHILOSOPHER, HUNTMASTER

As with any hunt club, the North State family is peppered with interesting characters. Perhaps the most beloved—and also the funniest—is Cicero McLean, longtime caretaker and huntmaster. McLean, who has

worked for North State since 1982, got the job with the help of his silver tongue: "I promised to run big bucks all the time," he laughed.

McLean maintains the club's buildings and grounds, cuts wood for the cabin and clubhouse fires and, perhaps most importantly, takes care of 50 dogs and their kennels. In an age when many deer clubs rent dogs for the hunting season, North State owns its dogs and keeps them on the property year-round. With his son, nephew and another young man helping him, McLean drives the dogs during the hunt and tracks them afterwards. Because many of the club's neighbors recognize North State dogs and will call McLean to come get them, he usually gets back almost every dog.

And there's nothing like the club's dogs to inspire a Cicero story or quip. He claims that once he "had a dog so good, I had to put tape on one side of his nose to keep him from tracking two deer at the same time." Then there's his recounting of the 1989 "White Christmas" hunt when members killed 37 deer—"the worst hunt with the most deer" he recalled—while constantly getting their vehicles stuck in the snow. McLean had to shovel snow all over the property, fix "100 water lines," track dogs by bloody paw prints and drive a tractor 5 miles back into the woods to free hunters' trucks.

McLean is a natural as the club's greeter, welcoming members as they arrive and showing guests the facilities. But no one outworks him either. He rises at 4 a.m. for Friday hunts, cleans and collects jawbones from deer, and generally keeps the hunt running smoothly.

The members of North State Game Club have managed to keep their enjoyable pastime going for 100 years with few problems. There is some concern among the membership that because dog hunting is problematic in other areas, the club might suffer at some point. But considering the remoteness of the area, it would likely be among the last places forced to deal with that issue.

Meanwhile, the club will continue to do what it has done for the last 10 decades with as few changes as possible. Respect for tradition and natural resources is a good start. Add in the elements of relaxed camaraderie, long-lasting brotherhood and downright fun, and you have a combination that's tough to beat. John Pickett Council would be pleased.

Greg Jenkins is editor of WINC.

THE HUNT THAT INSPIRES POETRY

KENNY WHITE/KENNETHAWHITEART.COM

"The Court at North Fryer" commemorates North State Game Club's 100th anniversary. The painting features members throughout the club's history, including founder John Pickett Council, seated right of the fire with his gun.

Time spent at North State Game Club has always inspired members to try their hand at verse. Depending on the experiences of the hunter in the field, his poems might be tender and touching, wry and mocking, or a deft combination of both. The foibles or habits of fellow members are often immortalized for all to enjoy.

The bard of North State Game Club was undoubtedly Kinchen B. Council, a charter member who wrote the deer camp classics "When the Hounds Give Tongue" and "The Buck that Got Away." Council also wrote rhyming letters to the club membership. On the occasion of a November 1914 hunt he had to miss, Council wrote,

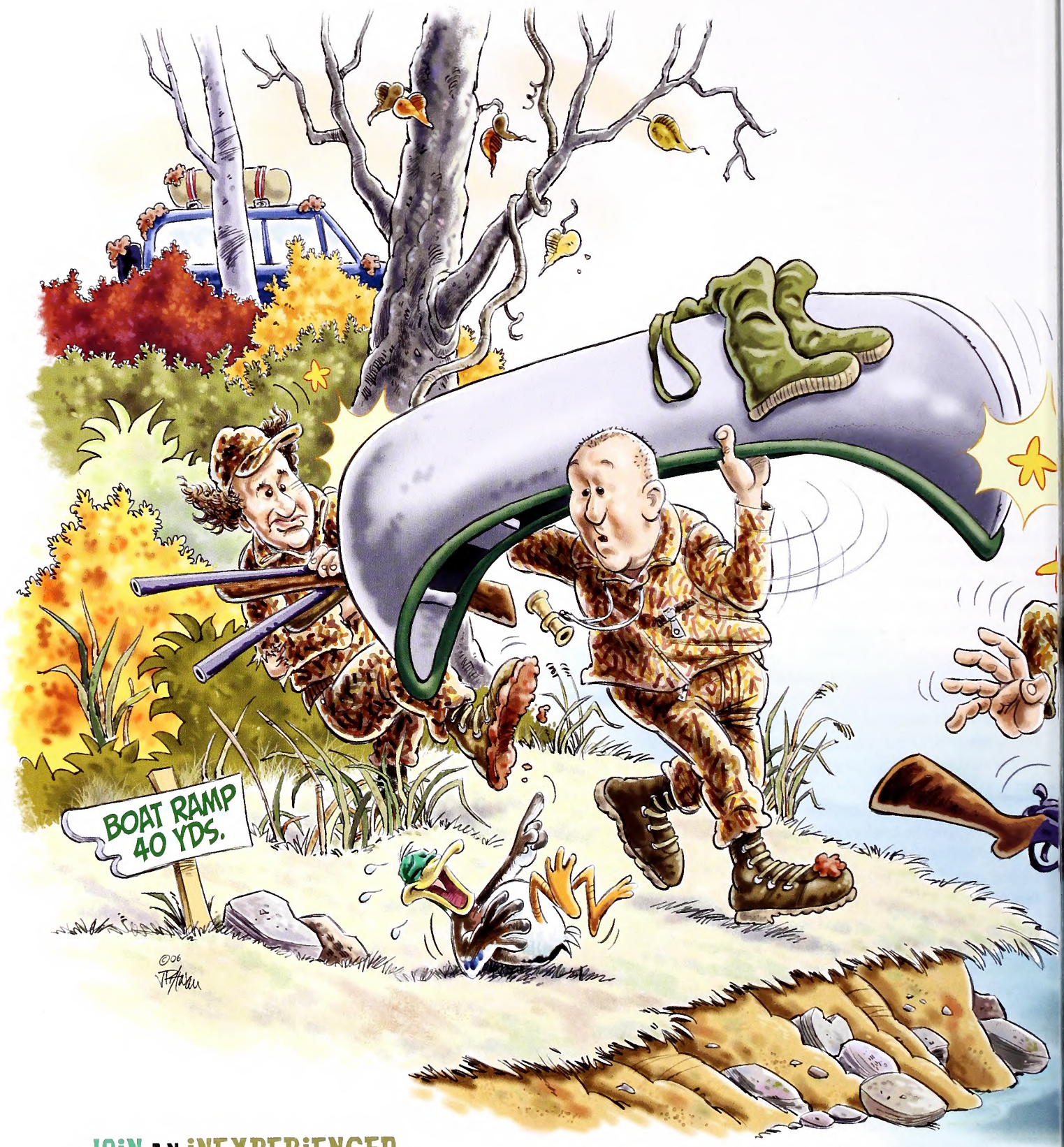
"To each and all of you, kind greetings I extend—
May fortune join you in the hunt and stay until the end;
Not in the present chase alone, but till you hear the hounds
Hot-foot behind the four-snags in the Happy Hunting Grounds."

If that letter is a fine example of the depth of sentiment North Staters hold for the hunt and one another, Council's "The Buck that Got Away" is the best sample of verse that has fun at members' expense:

"And old friend Farrior stood on guard beside the mile-post run,
He saw the deer and pulled so hard the trigger left his gun ...
Old Captain Barnes the deer next found as he went laughing by—
Captain shot a big hole in the ground, another in the sky ...
Nick Campbell grabbed his musket stock to hold the school house hill,
He shot and missed—he'd miss a flock of freight trains standing still ...
On went the deer and hounds in line through an old mill pond strand
And leaped the lake road at the pine that marks Sam Potts' stand.
But Sam was fast asleep; Tis true he woke in time to see
A white flag wave Adieu! Adieu! in courteous mockery."

Current members Dial Gray and Judge Sam Britt, among others, have carried on the tradition. Gray penned his verse "The Bull Pen Way" as a tribute to nights spent outdoors by the fire, and Britt composed his epic "Memories From a Deer Stand" to honor the club's traditions and friendships, and the abundance of game available. Anyone rendering a heartfelt verse will find a receptive audience at North State. "The poetry is especially touching," said member Hobson Morgan. "'The Buck that Got Away' epitomizes the Southern deer hunt."

—Greg Jenkins



JOIN AN INEXPERIENCED GROUP OF DUCK HUNTERS AS THEY FUMBLE AND STUMBLE THEIR WAY TO SUCCESS IN SPITE OF THEMSELVES.

GREENHORN WATERFOWL HUNTING

WRITTEN BY JONATHAN HEWITT

Most duck hunters have a story about a hunt gone wrong— that day when the ducks flared because Ed broke one of the unwritten duck hunting rules. You know the rules: You must be concealed, you must have decoys, scout your area, don't shoot your limit while in the process of building your blind. Alas, whether you were "Ed" in your hunting party or not, many of us have experienced the hunt gone wrong.

I'll admit to not being a great duck hunter. I'd be the first to tell you I've never called in a single bird into the decoys with the exception of an occasional nongame bird such as a grebe. I'm convinced ducks are astonished that a hunter could be as dimwitted as me, and perhaps the only reason I bag any ducks at all is because I use my dimwittedness to my advantage. Prior to 2002, I had only one duck hunt under my belt, and the only thing I remember about that particular day is that I caught a cold. The next season was different. On almost every hunt that year, we all were "Ed," but we still took a few ducks. (My apologies to anyone named Ed.)

If the season had to be summed up, it would mirror the Three Stooges or Laurel and Hardy. For example, our first hunt required a lot more physical exertion than a typical hunt. The morning started with a caravan of three trucks. One member of the hunting party was driving his wife's two-wheel drive SUV and managed to get it stuck. With mud caked on the vehicle, he concluded he might as well enjoy this hunt, as it could be his last once the Mrs. found out about his adventure.

With two other trucks, we managed to reach the river, only to find thick undergrowth and a rocky ledge to conquer. With all of our gear, Larry, Moe and Curly wrestled the canoe to the water, but not without struggling through briars, enduring a few scrapes and gaining a false sense of accomplishment.

This was my first time donning waders, and I was surprised how easily I could feel the coolness of the water through my five millimeters of neoprene. Toward the end of the hunt I learned that not only was it the coolness of the water I was feeling but the water itself. The water had been trickling into my waders the entire hunt as a result of my battle with the briars earlier in the morning. About mid-morning we called it a day. Once on land, the sun's rays revealed a gravel road 40 yards away leading to the water's edge, making access effortless, but the story less interesting. We bagged five birds that day.

ILLUSTRATED BY JACKIE PITTMAN

LIKE A POINTER CREEPING UP ON QUAIL, INTELLIGENCE TIP-TOED TOWARD US. WE DECIDED TO BUILD A BLIND USING THE LEFTOVER PILINGS OF A STRUCTURE LONG FORGOTTEN.

THE BISCUIT-EATIN' GUIDE

Not long into the season, reports of thousands of bluebills on the river changed our game plan, although we really didn't have much of a plan to begin with. Having learned where the ducks were, we decided to abandon our previous location for an area on the opposite side of the river. On the morning of this particular hunt, we followed our "guide's" lead. It is worth interjecting that our guide, as it were, had introduced himself, along with his wife, as having met at a biscuit-eating contest somewhere in Tennessee. Our biscuit-eatin' guide was no guide at all, just the guy with the plan for that day. In retrospect, we all should have foreseen the events about to unfold on this cold morning.

Surrounded by darkness, the four of us fought through an estimated 30 yards of tall vegetation while hauling a canoe full of gear, a dog and decoys. As a novice duck hunter, even I thought it strange that we didn't have a duck blind or concealment of any kind. Determined to make the best of it, we set out the decoys in waist-high water. We scattered ourselves on the ends and in the middle of the spread as the decoys bobbed on the waves crashing onto our chests.

When ducks started to fly we did the only thing we could do: crouched and waited. We looked about as inconspicuous as Santa Claus in a St. Patty's Day parade, but by lunch, three of the four Stooges filled their bluebill limit of three apiece. As for the canoe and dog, they had to stay on shore because of our, dare I say, "plan." Yet again, on our way back to the trucks, we found a smooth driving path down to the water's edge just feet from where we parked. There seemed to be a pattern emerging.

Like a pointer creeping up on quail, intelligence tip-toed toward us. We decided to build a blind using the leftover pilings of a structure long forgotten. The plan was to construct the blind one afternoon prior to hunting. Upon our arrival, we realized there weren't enough tools for three people. Space was also a factor, and we all know what happens if the Stooges are given hammers in a confined area. With decoys still in the bag, construction commenced, one person nailing and the other sawing boards to length.

Meanwhile, I loaded my gun, waded a safe distance and kept an eye out for meddling ducks. I remained within shouting distance in case anyone needed a hand. Despite the pounding resonance of the hammer, the hum of the saw, the constant movement and my wading around in the open, ducks began to fly. Seemingly out of curiosity, they flew overhead, not once but several times. Indeed, I think I remember a bluebill hen rub her eyes in disbelief as she winged past. After an hour or so of hammering and sawing, three shots aimed in a safe direction yielded a limit of bluebills just as construction wrapped up.

HUNTING THE SKINNY BLIND

A couple of weeks later, we rushed to the river after work for a short hunt. Yours truly managed to forget his waders and out of the kindness of my heart, I let my hunting partner push me around in the canoe for several hundred yards. Because I let him chauffeur me around, in his graciousness, he never let me forget it.

By midseason we had our act together. The blind was complete, the scaup had been scouted and we were doing well. We knew how to get to the water, we remembered our waders and might have been able to pass for real duck hunters.

The final hunt of the year was no less entertaining than the rest of the season. It was an afternoon hunt, and we decided on an area we had never scouted. This time there were no canoes—just decoys, waders and shotguns. We set out the decoys in water almost to our knees. Blind? What blind? The figurative intellectual bird dog that snuck up on us earlier in the season seemed to have wandered off in search of gentlemen who might actually put him to good use. For a solution to our lack of cover, however, we found downed tree limbs and placed them in three separate locations among the decoys. We positioned them in the sand beneath the shallow water to stand on their own.

Allow me to paint the picture adequately. In comparison, our boughs made Charlie Brown's Christmas tree look like the enormous specimen used by the White House each year. Other hunters on the water that afternoon were in well-built blinds or nice boats. As each full-grown man hid behind his anemic camouflage, I imagine the contrast was humorous at the very least. If you listened carefully you could almost here the distant sound of laughter bouncing across the water.

Nonetheless, kneeling down behind our "trees," and despite our poor shooting, we each had our limits within about 90 minutes. Finally, redemption for the Stooges. When we were packed up, birds were still flying over our location. Looking back on that day, the sun was setting behind us and the birds were flying into the sun. To them, we probably didn't look as ridiculous as we felt behind our trees.

Regardless of how many poor decisions we made, we had a successful season. Reminiscing about lessons learned, I realized the ducks we hunted had never read any books about what behavior they were to exhibit. Since then I've hunted on occasion, doing everything by the book, obeying the rules, and have left empty-handed. I have to admit, since my first season I have utilized the stand-in-the-water or walk-around-in-the-water method with success. Just last year on the season-opener, three of the four ducks I shot fell to the wading method as I was trying to get to the other side of the water. It sounds like a chicken joke I know, but sometimes it works. ◆

Jonathan Hewitt, an Elizabeth City native, is an athletic trainer for the U.S. Marine Corps in Jacksonville. This is his second feature for Wildlife in North Carolina.

ALLOW ME TO PAINT THE PICTURE ADEQUATELY. IN COMPARISON, OUR BOUGHS MADE CHARLIE BROWN'S CHRISTMAS TREE LOOK LIKE THE ENORMOUS SPECIMEN USED BY THE WHITE HOUSE EACH YEAR.

Roots and Shoots

written by Helen Correll / illustrations and nature activity by Anne M. Runyon

Draw a picture of a tree. When your drawing is done, you've shown, perhaps, a trunk with branches topped with leaves. But wait: this is only *half* a tree. Trees and other plants have a network of roots below ground supporting them and feeding them from their very first sprout. Without roots, there would be no shoots.

REGULAR ROOTS

When a sunflower seed germinates, it immediately sends down its first root, the *radicle*. As soon as the radicle sprouts, it begins growing thousands of tiny root hairs. On the tip is a *root cap*, with special cells that protect the tip of the root as it pushes its way through the soil. The root hairs begin to absorb minerals and water found as a thin film around almost all soil particles—even in soil that looks dry. Water then swells the seed's tissues and causes it to split open its protective seed coat.

A longleaf pine seed germinates.

While the primary root is pushing its way into the soil, the shoot is growing taller. From the moment the seed sprouts, the root and the shoot are dependent on each other. The roots are busy collecting water and minerals and sending them up to the leaves through tiny tubes called *xylem*. At the same time, the leaves are making food (through photosynthesis) and sending it back to the roots through tiny tubes called *phloem*.

Roots also anchor the plant to the earth. Since plants can't come in out of the weather, when howling winds make plants and trees sway and twirl, or flooding rivers leave their banks, roots help plants stay put in one place. The deeper the roots, the more secure the plant.

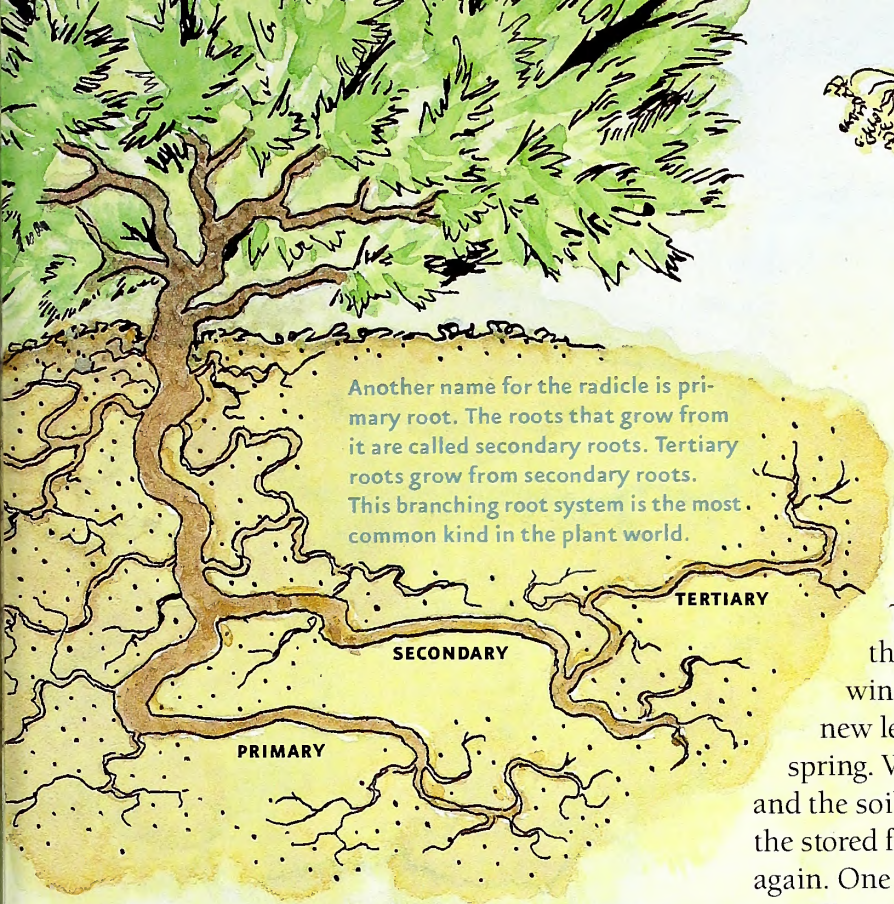
SPECIAL ROOTS

Another way some plants secure themselves is by growing *adventicious roots*, or roots that grow above the ground from an unusual part of the plant, such as leaf nodes. Climbing plants, like virginia creeper, grow adventicious roots to help them cling to walls or trees. Corn plants grow them from the bottom of the plant's main stem for extra support. Some trees grow adventicious roots to help prop themselves up.

Certain plants make new plants by sending out a shoot sideways. Adventicious roots will grow at each leaf node and a new shoot grows above the roots. When this happens, whether above or below the ground, the shoots are called *stolons*. Wild strawberries reproduce by growing stolons.

In some plants, the primary root keeps growing and growing until it is the largest and longest root. There is no branching—all other roots grow from the primary root. This kind of root is called a *taproot*.

The aerial roots of the trumpet vine cling to a pine tree's bark.



Another name for the radicle is primary root. The roots that grow from it are called secondary roots. Tertiary roots grow from secondary roots. This branching root system is the most common kind in the plant world.

STORAGE ROOTS

Plants that live more than one year send food to their roots during summer, then die back when winter comes. The stored food allows them to get through their winter rest and to send up new leaves and flowers in the spring. When the days lengthen and the soil warms, the plant uses the stored food to start growing again. One type of storage root is actually a swollen taproot. The roots become larger as nutrients are collected. Carrots are swollen taproots, so when you eat one, you are eating the food the plant had saved for its next year's growth.

A Queen Anne's lace stores food in its swollen taproot.

FALSE STORAGE ROOTS

Some plants have what you may think of as storage roots that are not true roots at all. Daffodils and tulips grow from bulbs, which are shortened, underground stems surrounded by swollen leaves. The bud is at the tip of the stem, deep inside the bulb.

Crocus grow from *corms*, which are swollen stems. They have a shape similar to a bulb, but don't have swollen leaves. Their leaves are nothing but dry, papery covering for the corm.

Another stem that pretends to be a root is called a *rhizome*. It looks nothing like a bulb or a corm but grows sideways just below the soil surface. Some rhizomes are fat and fleshy while others are thin and brittle.

More storage can be found in a *tuber*, a swollen part of an underground stem. Potatoes are tubers everyone is familiar with. The "eyes" on a potato are its nodes.

All of these pretend roots are underground food storage bins for plants. When the growing season begins for bulbs, corms, rhizomes and tubers, true roots grow down from them and shoots grow up.

The Schweinitz's sunflower has tuberous roots.

OTHER ROOTS

High on the branches of trees live epiphytes, such as the green fly orchid and resurrection ferns. These plants have adapted to life without soil by absorbing mineral salts from the host tree and moisture from the air. At the beach, sea oats grow from rhizomes that create a mass of tangled roots that helps protect the beach from erosion.

In swamps in southeastern North Carolina grow carnivorous plants, such as the Venus' Flytrap and the Yellow Pitcher Plant. The root systems of these plants are small and weak, and used mainly for support. These plants have adapted to living in the swamp by getting nutrients from insects' bodies instead of from the soil.

A cut-away of the yellow pitcher plant, growing in swampy soil, reveals insects caught as supplemental food.

IN THE SWAMP

Plants that live in swamps have a particular problem. The soil in a swamp is waterlogged and has very little oxygen. Since plants must have oxygen to survive, swamp plants have had to adapt in order to live there. Some have developed special air spaces in the tissue of the plant. Some have vertical roots rising above the water and mud that allow air to pass into them and then be transported to the submerged parts of the plant. Black Tupelos have adapted to swamp life by having buttressed, or swollen, trunk bases. Cypress trees grow knees that poke up through the filmy swamp water. Scientists are still not sure if the knees are only anchors, or if they provide gas exchange to oxygenate the underwater roots, or act as food storage bins. Perhaps they do all three.

Get Outside

Go on a root hunt: Take a walk with a magnifying lens and search for different kinds of plant roots. First, find an ivy vine climbing up a wall or tree. Look for the adventicious roots that help it cling to its support. Look in the woods for a tree that has been toppled by the wind. Study the large root system that supported and fed the tree during its lifetime. Some kinds of weeds persist into December. Have an adult help you look for some in a garden or yard and try to gently pull them up. Compare the different kinds of roots. Use your magnifying lens to look for root hairs. (Make sure to stay away from poison ivy and poison oak.)

Read and Find Out

- "Eyewitness Books: PLANT" by David Burnie, Alfred A. Knopf, Inc., 1989.
- "From Seed to Plant" by Gail Gibbons, Holiday House, 1993.
- "Plant Plumbing: A Book About Roots and Stems" by Susan Blackaby, Picture Window Books, 2003.

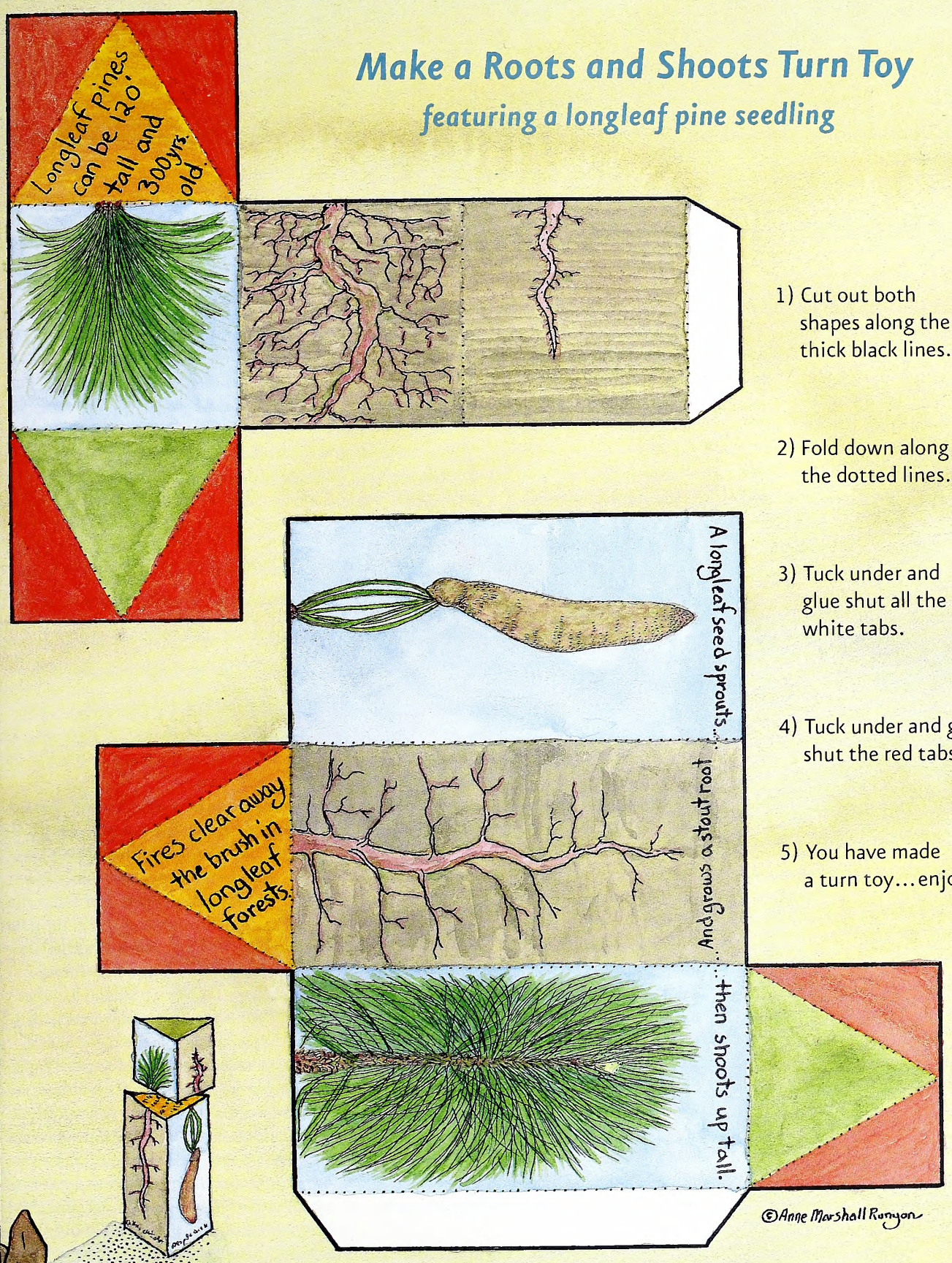
In *Wildlife in North Carolina*:

- "Partners for Life" by Lawrence S. Earley, March 1996.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at ncwildlife.org.

Make a Roots and Shoots Turn Toy

featuring a longleaf pine seedling



1) Cut out both shapes along the thick black lines.

2) Fold down along all the dotted lines.

3) Tuck under and glue shut all the white tabs.

4) Tuck under and glue shut the red tabs.

5) You have made a turn toy...enjoy!

This activity may be downloaded at ncwildlife.org, the magazine page, and copied for educational purposes.

Marine Protected Area in North Carolina's Future

The South Atlantic Fishery Management Council (SAFMC) likely will designate North Carolina's first Marine Protected Area (MPA) when it meets in March to adopt Amendment 14 to the Snapper Grouper Fisheries Management Plan. The MPA, one of eight stretching from North Carolina to the Florida Keys, is being established

Source: The South Atlantic Fishery Management Council

MAP BY CARLA OSBORNE

There is little difference between the two MPAs. Alternative 1, the preferred alternative, is located closer to the shore and may contain more hard-bottom habitat.

to protect species of the snapper grouper complex from directed fishing pressure in federal waters.

Each of the MPAs is designated as a Type II, meaning that fishing for some species will be allowed. Although commercial and recreational fishermen can not target any snapper grouper species, they will be able to troll for such fish as dolphin, billfish and tuna. North Carolina's MPA is located about 55 nautical miles southeast of Southport and extends along the continental shelf in waters up to 1,000 feet deep. It has a rectangular shape and measure about 10 nautical miles by 15 nautical miles. (A nautical mile is approximately 1.15 statute miles.) The location, known as the Snowy Grouper Wreck MPA, is known to hold snowy grouper, gag, speckled hind and red porgy.

The snapper grouper complex is comprised of 73 species, including deep-water, slow-growing species such as snowy grouper, misty grouper, speckled hind, Warsaw grouper, golden tilefish and blueline tilefish. Some of the species are overfished and overfishing is continuing; for others, their status is unknown.

Many snapper grouper are vulnerable to overfishing for several reasons: 1) they are long-lived fish, sometimes reaching 50 years of age; 2) they are protogynous (they change from females to males as they grow older and larger); and 3) they form spawning aggregations. Deep-water species also tend not to survive the trauma of capture.

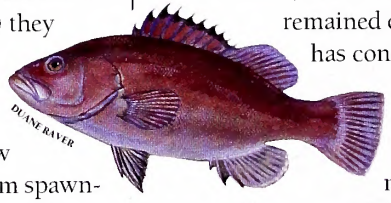
In 2005, commercial fishermen in North Carolina landed 579,307 pounds of various groupers, with the gag (251,645 pounds) being the most frequently harvested. Recreational anglers landed 357,475 pounds of groupers. The recreational harvest is not broken down by species.

The establishment of the MPAs and harvest quotas mandated by Amendment 13C are expected to help rebuild snapper grouper species. The amendment cuts the commercial catch of snowy grouper from 344,508 pounds gutted weight for the four states (North Carolina, South Carolina, Georgia and Florida) to 151,000 pounds in 2006, 118,000 in 2007 and 84,000 in 2008. Recreational anglers are restricted to one snowy grouper in a five-grouper bag limit.

Snowy Grouper Commercial Limits

Year	Annual Pounds (gutted weight)	Trip Limit
2006	151,000	275
2007	118,000	175
2008	84,000	100

The snapper grouper complex is comprised of 73 species, including deep-water, slow-growing species such as snowy grouper, misty grouper, speckled hind, Warsaw grouper, golden tilefish and blueline tilefish.


DUANE RAVER

Because commercial fishermen had already caught the 2006 limit when the rule became final in October, their season was closed, but the recreational season remained open. North Carolina has contended that the data used to formulate the new limits—in federal fisheries management called "best available data"—is both flawed and does not give sufficient weight to the adverse effects the rules will have on North Carolina fishermen. "The example I like to use is if you took a census of North Carolina's population, started at Hatteras and then stopped at I-95 because you ran out of money," said Louis Daniel, chief biologist with the N.C. Division of Marine Fisheries. "What does that tell you about North Carolina's population? You wouldn't have very accurate information."

Americans' Support of Hunting Grows

A new nationwide survey of Americans 18 and older shows that a strong majority of them support hunting and fishing. The survey, conducted by Responsive Management of Harrisonburg, Va., found that support for hunting and fishing has remained strong over the past decade, with approximately every three out of four Americans approving of legal hunting and more than nine out of 10 approving of recreational fishing.

"We have been seeing public support for hunting increase in several states over the past decade where we had data but this is the first nationwide study where we could verify that public support has increased over the past decade," said Mark Damian Duda, executive director of Responsive Management. In 1995, 73 percent of Americans approved of hunting while in 2006, 78 percent approved of hunting. Support for fishing nationwide, as well as in numerous states where we have conducted studies, remains very high." Although approval of fishing has decreased slightly, dropping 1.7 percentage points from 95 percent in 1995 to 93.3 percent in 2006, most Americans approve of recreational fishing.

The results of this survey reflect the opinions of randomly selected U.S. adult residents based on a scientific telephone survey of 813 Americans conducted from Aug. 31 to Sept. 9, 2006. The sampling error is 3.44 percentage points.

The poll was conducted as part of two larger projects—a book being written on

MELISSA McGAW

sportsmen's issues by Duda, Marty Jones, and Andrea Criscione of Responsive Management that was commissioned by the Congressional Sportsmen's Foundation and a study on the future of hunting and the shooting sports under a grant from the U.S. Fish and Wildlife Service.

Officials in the hunting and fishing industries are encouraged by the public support, citing the important role that sportsmen play in a number of areas, including conservation and the economy. Steve Williams, current president of the Wildlife Management Institute and former director of the U.S. Fish and Wildlife Service, noted, "Sportsmen are essential to wildlife protection and management. Game management programs, which are funded by sportsmen's dollars, have brought back numerous wildlife species from unhealthy population levels, such as wild turkey, wood ducks, white-tailed deer, beaver, pronghorn antelope, and Canada geese to name a few."

ON PATROL

While patrolling night deer hunting, Officer Chad Martin observed someone shining a field using truck headlights. After watching the suspect shine the field in four different locations, Martin made a stop. Then something caught Martin's eye.

So what could make a night deer hunting stop even better? How about a pair of fresh turkey legs lying in plain sight in the bed of the suspect truck?

Upon searching the truck, Officer Martin removed a loaded shotgun, a loaded rifle and a concealed pistol. The suspect claimed that he was not night deer hunting, but looking for another hunter. And as for the turkey legs, he said that while he had been out drinking the night before, someone put them in the back of his truck. And to make that story even better, he wasn't sure if they were turkey legs or hawk legs. The suspect was charged with night deer hunting, illegal possession of a wild turkey and carrying a concealed weapon. He was found guilty of the charges.

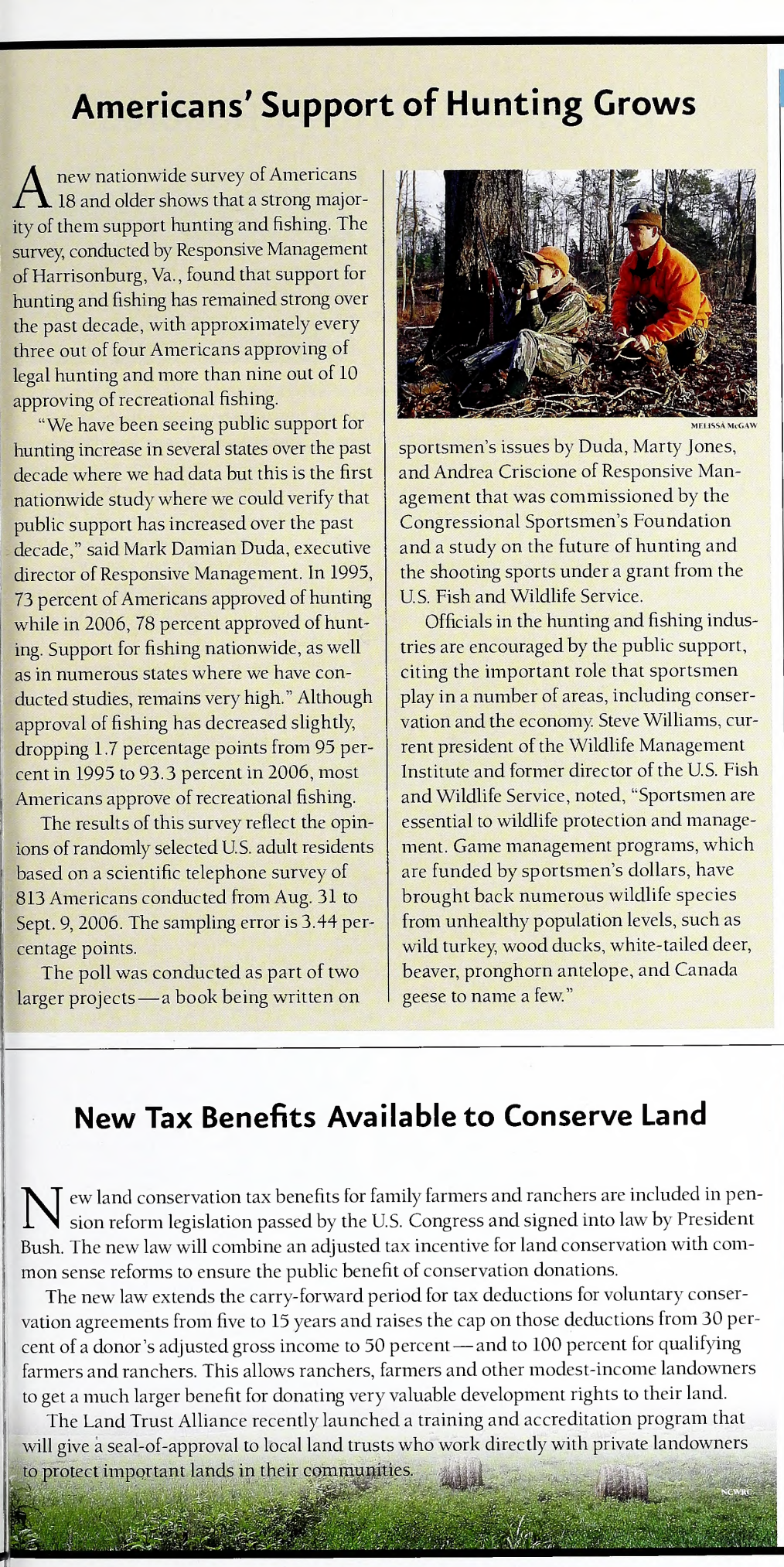
ILLUSTRATED BY JACKIE PITTMAN

New Tax Benefits Available to Conserve Land

New land conservation tax benefits for family farmers and ranchers are included in pension reform legislation passed by the U.S. Congress and signed into law by President Bush. The new law will combine an adjusted tax incentive for land conservation with common sense reforms to ensure the public benefit of conservation donations.

The new law extends the carry-forward period for tax deductions for voluntary conservation agreements from five to 15 years and raises the cap on those deductions from 30 percent of a donor's adjusted gross income to 50 percent—and to 100 percent for qualifying farmers and ranchers. This allows ranchers, farmers and other modest-income landowners to get a much larger benefit for donating very valuable development rights to their land.

The Land Trust Alliance recently launched a training and accreditation program that will give a seal-of-approval to local land trusts who work directly with private landowners to protect important lands in their communities.



NCWRC

Wildlife Endowment Fund Report

Fund Balance $59,609,383.92

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine, as well as tax-deductible contributions. Although the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future. See ncwildlife.org for information.

CALENDAR OF EVENTS

Saturday, Dec. 2

Take a van tour of Mattamuskeet National Wildlife Refuge and view the thousands of ducks, geese and swans that return annually to Hyde County. Reservations are required. Call the refuge office at (252) 926-4021.

Saturday–Sunday, Dec. 2–3

Check out the 19th Annual Core Sound Decoy Festival at the Harkers Island Elementary School. Activities include carving competition, children's decoy painting, decoy auction and the world loon calling competition. For additional information, call (252) 838-8818. Waterfowl Weekend at the Core Sound Waterfowl Museum runs concurrently with the Decoy Festival. Visit coresound.com.

Saturday, Dec. 9

Enjoy seasonal tales such as "Why Evergreens Aren't Perfect," and make edible ornaments for the WILD tree at the Schiele Museum's Celebrate Wildlife in Gastonia. Visit schielemuseum.org or call (704) 866-6908.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Oyster Creek Project Honored

SCOTT TAYLOR

The N.C. Wildlife Resources Commission's Oyster Creek boating access area has won an Outstanding Project award from the States Organization for Boating Access (SOBA) in the small-access category. The access area, located in eastern Carteret County, won for its quality and innovative design.

Mark Cooney, the commission's Design Services Section chief, accepted the award on behalf of the commission during SOBA's 20th Annual Conference in Tampa, Fla.

The boating access area, completed in 2005, provides boaters, hunters and anglers access to Core Sound with minimal impact on an ecologically important estuary. The estuary, with its extensive marshes, is home to a wide variety of wildlife, including blue herons, raccoons, blue crabs, oysters, scallops and other small marine organisms. Tundra swans and other waterfowl winter on the creek and popular game fishes, such as red drum, speckled trout, spot and croakers use the estuary as a nursery area.

Commission personnel incorporated many fish- and wildlife-friendly features when constructing the access area, paving part of the site with pervious concrete, a porous substance that allows stormwater to drain through quickly, even in heavy rains.

A stone sill, a shallow-water rock structure, was also built parallel to the shore and planted with marsh grasses to stabilize the shoreline and protect the access site from beach erosion.

SCOTT TAYLOR

Disabled-boater features, such as an 8-foot-wide floating dock with handicap handrail, make the ramp accessible to hunters, anglers and boaters of all abilities.

For more information on boating and boating access areas in North Carolina, visit the commission's Web site, ncwildlife.org, or call the Division of Engineering Services, (919) 707-0150.

IN SEASON

This month, these hunting seasons are open in North Carolina:

Bear: See *2006–2007 N.C. Regulations Digest* for dates and locations.
Bobcat: Through Feb. 28.
Common Snipe: Through Feb. 28.
Crow: Wednesday, Friday and Saturday of each week between June 1, 2006 and Feb. 28, 2007, plus Christmas.
Fox: Runs Jan. 6–27. See *Regulations Digest* for locations.
Mourning Dove: Runs Dec. 18–Jan. 13.
Opossum and Raccoon: Through Feb. 28.
Pheasant: Through Feb. 1.
Quail: Through Feb. 28.
Rabbit: Through Feb. 28.
Ruffed Grouse: Through Feb. 28.
Squirrel: Red and gray season through Jan. 31.
White-tailed Deer: Western gun season through Dec. 9. Northwest gun season through Dec. 16. Central and Eastern gun season through Jan. 1.
Wild Boar: Runs Dec. 11–Jan. 1.
Woodcock: Runs Dec. 15–Jan. 13.

Migratory Waterfowl

Brant: Season runs Dec. 25–Jan. 27.
Canada and White-Fronted Geese: Resident Population through Dec. 2 and Dec. 16–Jan. 27; South James Bay Population through Dec. 30; Northeast Hunt Zone runs Dec. 27–Jan. 27 by permit only.
Ducks, Coots and Mergansers: Through Dec. 3 and Dec. 16–Jan. 27. (Black and mottled duck seasons closed until Dec. 1; harlequin duck season closed).
Sea Ducks: Through Jan. 27.
Snow, Blue and Ross' Geese: Through March 3.
Tundra Swan: Through Jan. 31 by permit only.

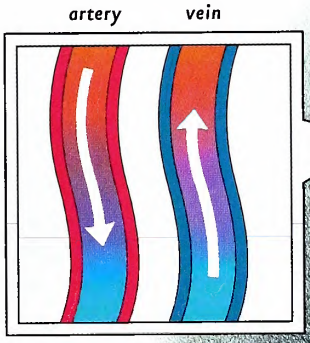
Check the *2006–2007 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit ncwildlife.org.

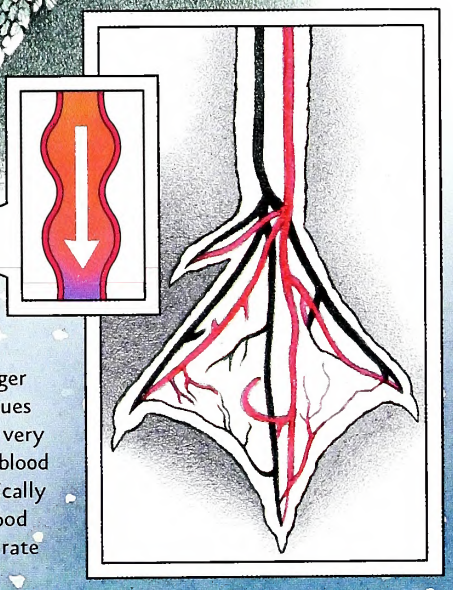
Why Don't Ducks' Feet Freeze When They Sleep On Ice?

written by Clyde Sorenson
illustrated by Jim Brown

DUCKS ARE EXQUISITELY well adapted to cold weather. A number of elegant adaptations allow them to stand for hours on ice with no apparent discomfort and with little loss of valuable body heat.

The duck's feet and legs have a counter-current heat exchange system — the arteries leaving the body's core are very close to the veins returning from the feet. The cold blood returning to the body from the feet is warmed by the arterial blood descending towards the feet, recapturing the body's heat reserves. Reduced blood flow also makes the tissues of the feet better insulators of what little heat they contain.





When it's really cold, the duck may stand on one foot or hunker down on the ice, but not because its feet feel cold (the bird's feet have relatively few sensory nerves). Tucking a foot into its superbly insulating down can reduce total heat loss more than 20 percent; and hiding both feet might save 50 percent.

The counter-current heat exchanger could be so effective that the tissues in the duck's foot might freeze in very cold weather. To prevent this, the blood vessels in the foot and leg periodically dilate, allowing warm blood to flood the foot. The bird shivers to generate the "replacement" heat.

The Grateful Dead

written by Jim Dean

Old habits linger. Long past the time when most doves have migrated south, I still keep an eye out for them whenever I happen to be driving along a country road. During the late fall and winter dove seasons, I know I'm not likely to see more than the occasional pair sitting on a wire, and those birds would be feasting on roast'n ears in Cancun within 24 hours if anybody took a shot at them. Late-season dove hunting is typically tough. Not only are there far fewer birds, but those that remain are scattered and have lost their early-season loyalty to any particular field.

ILLUSTRATION BY JACKIE PITTMAN

But I keep looking because I remember that cool late fall day years ago when Mike Gaddis and I found telephone wires sagging with doves on a rural road an hour or so southeast of Raleigh. We certainly didn't expect to see so many birds trading in and out of a single small field of late-harvested corn. The landowner was more than happy to let us hunt them, and we quickly stacked up a few beaten-down corn stalks for makeshift blinds.

As usual, Mike and his wonderful black lab Squaw sat back to back. Squaw knew exactly what to look for, and she would signal any doves approaching from her side by simply quivering. Together, they were a deadly combination, and we soon had our limits.

Or rather, Mike had his limit. Any dove I elect to shoot at is by far the safest one in the bunch—although the third one trailing behind better watch his butt. Squaw, however, had a better day than either of us, retrieving not only all of Mike's doves, but all of mine—which were usually crippled and in deep cover.

"If it were honorable to shoot them on the ground, a dove in your sights might as well wrap himself in bacon and climb on the grill," a friend once kindly observed. "Providing, of course, that he's not walking very fast."

Even so, I eventually got my limit, and Mike and I left our guns in the car. Then we went back into the field and simply watched the doves fly to us, rosy-breasted in the slanting sunlight. It might have been the best late-season hunt I was ever part of. But there was one other particularly memorable, albeit very strange, hunt.

Mike and Squaw and I were scouting some favorite spots down east when we chanced upon an improbably large bunch of doves. As I recall, the landowner told us that some interloping rascals had appropriated—without his knowledge—one of his fallow fields and planted an illegal crop of marijuana. Their endeavor had been discovered, and the Feds had destroyed the crop and plowed it under.

Apparently, whatever remained was of prime interest to the local dove population. As we took our stands, doves were lifting and dropping in waves so thick that it looked as though someone were shaking out a huge gray flannel blanket.

Even I could hit those birds. Was it merely my imagination that those doves were well past caring whether anybody was shooting at them? Most of them drifted lazily overhead, and they clearly had the munchies.

We later concluded that the best blind that day would have been a stand selling lava lamps, beads and Jerry Garcia 8-tracks. I confess that I felt a little guilty taking advantage of this situation, but it's not true that I shot a dove while it was trying to put a flower in the barrel of my shotgun.

I have not heard of any other similar dove hunting experiences involving plowed pot, and I certainly don't know anyone who has planted pot purely to attract doves (try telling that to a judge).

Harvested corn is the crop most dove hunters look for, and with good reason. Sunflowers are also a dove favorite, and more and more farmers are now planting them as an alternative crop.

Another crop favored by doves is browntop millet, although there seems to be less of it grown nowadays. Serious hunters would do well, however, to look beyond these traditional crops. Croton is not called dove weed by accident, and this small-seeded wild plant often grows in abundance in cotton fields. With the eradication of the boll weevil and the return of cotton as a major crop in North Carolina, the cotton-croton connection affords an increasingly important opportunity for dove hunters.

Some superb dove hunting can also be found over cucumbers, watermelons and similar crops after the fruits dry and split open, spilling seeds. And because these seeds are more likely to be available later in the season, that's the time to look there for doves.

Next year, it might pay to keep these less obvious dove foods in mind, especially if you hunt the later seasons. However, you'd probably be wise to wear camouflage. That old tie-dyed T-shirt is going to be a better choice only when the doves are flying "high."

"It's not true that I shot a dove while it was trying to put a flower in the barrel of my shotgun."

"I frequently tramped eight or 10 miles through the deepest snow to keep an appointment with a beech-tree, or a yellow birch, or an old acquaintance among the pines."

–Henry David Thoreau, "Walden"

HARRISON SHULL

OUTDOOR MOMENT

IN THE JANUARY ISSUE

NCWRC

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